CQ

RADIO AMATEURS' JOURNAL

MARCH
1952

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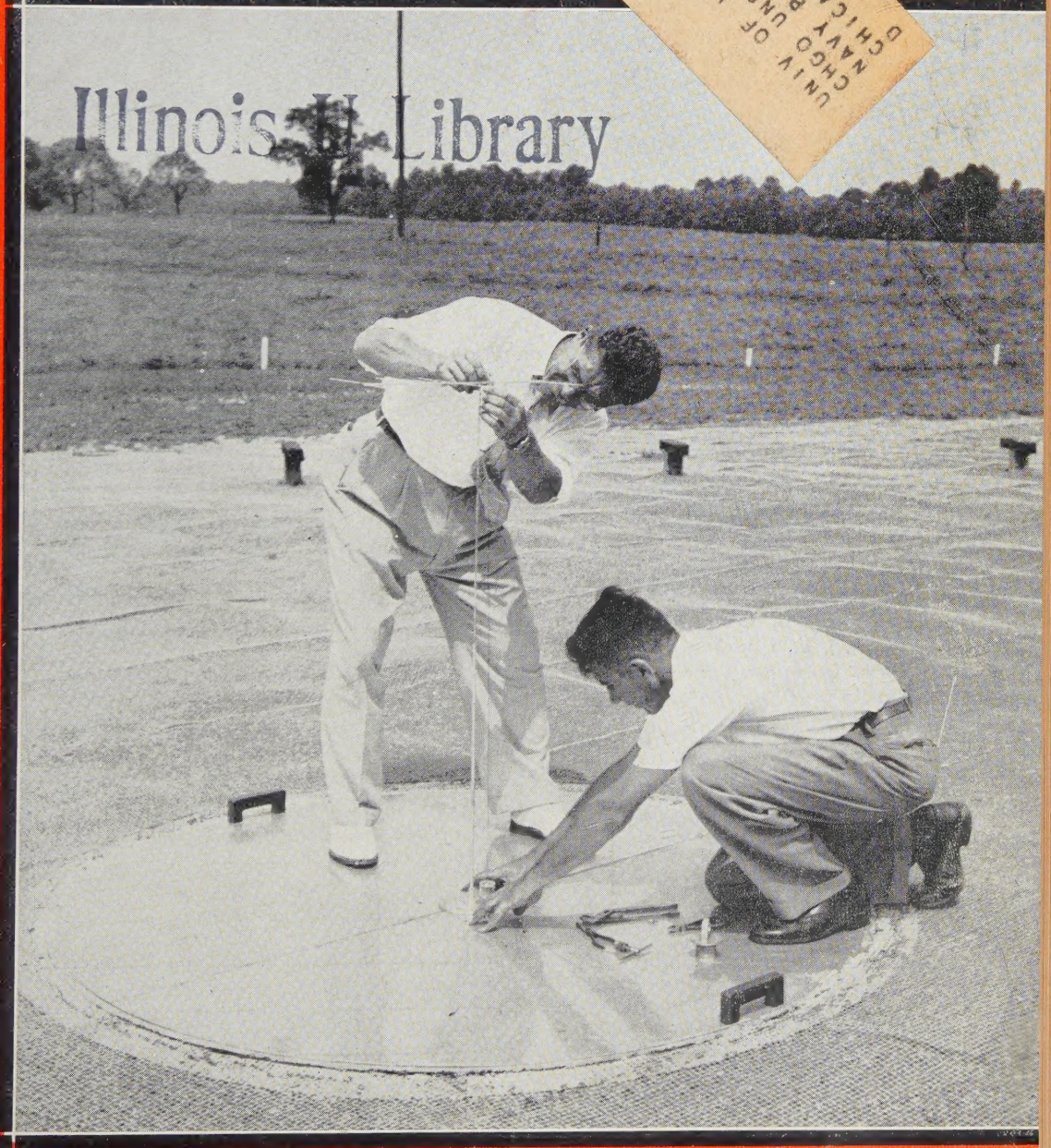

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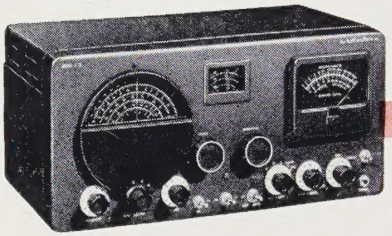

S-76

Everyone who qualifies WINS!

Remember, *everyone* who completes the course wins! The *first ten* Novices who complete the following will receive, absolutely FREE, a Hallicrafters S-76 Receiver. *All* of the other Novices who complete will receive $25 in cash, each.

1 HALLICRAFTERS Merit Awards will be given to every Novice who, during the period beginning 12:01 A. M., September 8, 1951, and ending 12:00 P. M. September 7, 1952, (local time) works all states and has obtained by September 7, 1952, a General or Conditional Class Amateur License. Both Novice-Class and "regular" QSOs can be used to make up the total of 48 contacts.

2 Rules governing contacts and verifications thereof are the same as for ARRL W.A.S. Certificates (see page 6, "Operating an Amateur Station"). Your package of verifications must be postmarked not later than October 7, 1952.

Thanks to all of you who have already dropped us a line that you are "working all states" for the 1951-1952 Merit Awards. We would like to know the names of everyone who is competing —so we can publish later a list of calls, names and addresses of those in the running. This list will help you in your contacts.

So please mail in postcard, or the coupon below:

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Bill Halligan, Jr. WN90EP
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MY CALL_____ DATE OF LICENSE_____

NAME_____

STREET_____

CITY_____ ZONE_____ STATE_____

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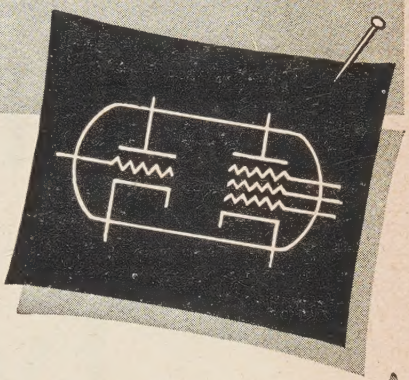

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VOL. 8 NO. 3 MARCH, 1952

CONTENTS

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OUR COVER

Adjusting a test antenna on the National Bureau of Standards model antenna range. The small antenna being placed in test position by Messrs. Cottony and Gorbaczewski is a miniature version of a five-element Yagi designed for 50 mc. The test antenna is located in the center of an oval shaped ground plane composed of metal hardware cloth. The test antenna picks up a signal from a target transmitter in the vertex of a "V" frame that moves in an 180-degree arc above and around the antenna. (See page 46)

Scratchi 4
Broad Band 6
Zero Bias 9
Safety Methods for Erection of Beam Poles
A. W. Kurtz, W8ENS 11
The Very Electronic Key
G. Franklin Montgomery, W3FQB 14
Effects of Planetary Positions on Radio Signals
J. H. Nelson 16
The PU Expedition
R. W. Schoening, W0TKX 18
Men of Radio
William R. Wellman 20
Novice Shack 23
DX & Overseas News 25
Mobile Corner 29
The YL's Frequency 30
Shack & Workshop 32
Emergency Converter-Transmitter for 10 Meters
Hartland B. Smith, W8VVD 33
The Old One-Two
Major R. H. Mitchell, W6TZB 38
Ionospheric Propagation Conditions. 41
The VHF News 44
The Codetyper 52
The Private Life of CQ 56
Classified Ads 70, 71
Advertising Index 72

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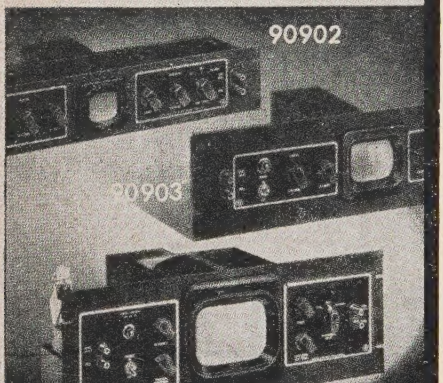
Application



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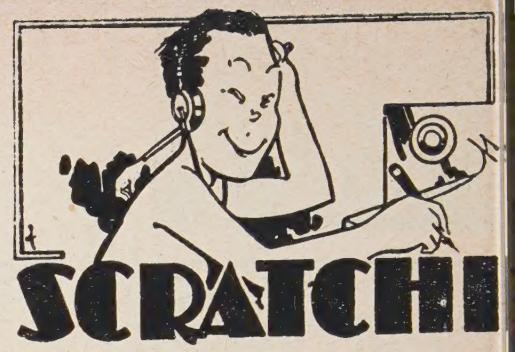

Feenix, Ari

Deer Hon. Ed:

Don't ever trying to teach a newcomer the code or it may be a case of somebuddy biting the han that wields the key. At least, Scratchi are trying thi hewmanitarium job and are now close to winding u in jale. Not that I minding jale, as the food there i not bad, but what with this being the DX season are having things to do and can't doing same whe in the pokey.

This hole thing are starting cupple of weeks ag at a local amchoor club meeting. Scratchi are talkin with some old-timers about a new club member wh having so much on the ball mentally. This newcome are reely a whiz with the theery. He are not onl able to telling you the rite formula to use in a prob lem, but he can telling you the formula to get th formula. No doubts about it, he are a 1/c geenyus The only trubble is, he not knowing the code, an not being able to get his license. (I trying to get hi interested in bootlegging, but he had already rea the FCC law about $10,000 fine and two years i jale).

The other club members are claiming that thi geenyus can not learning code, and I arguing that h could learn code easily. The upshoot of the argue ment is that I are betting ten bux that I can teach this guy to learning the code before the next exams are given. Me and my big mouth. Why didn't some one tell me the inspecktor are going to be in town next week?

Well, ten bux is ten bux, so I get to work. I invite the guy out to the ranch, and while he there I making a nice tape recording on Brother Itchi's new tape recorder. I sending the alphabet twice, once slow and once fast, then sending some five-figure code groups. I giving him a copy of what I sending, so he can listen and study as he listening. Then I send him home to study the code, as he having his own tape recorder.

I dropping by at his house next night, and he doing fine. I see him copying down letters at a speed of 8 or 9 WPM. I dropping in next night, and night after that. He are very good student, sitting there with earphones on head, and copying like furious. In four days he now reeding my coded groups at a speed of 15 WPM. Boy oh boy, will I showing those scoffer fellows at next club meeting! Being in reel high speerits I call up one of the club members and make another bet for ten bux on this guy passing the code test. Let's see now, what can I bying for twenty iron men??

Come the fateful night, I taking my student down to see the inspecktor, to making sure he well taken care of. Everything going along smoothly up to time that the inspecktor starts the code machine. When

(Continued on page 54)

NOW AT HOME IN SPARE TIME!

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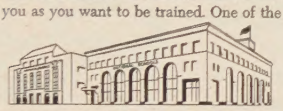

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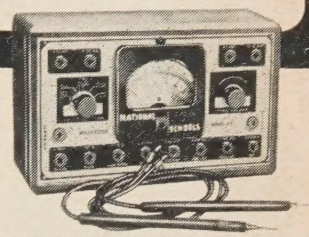

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Broad Band . .

Men of Radio

Editor, CQ:

I was very much interested in Mr. Wellman's article (January, *CQ*) and would like to see the series continued. As a matter of fact, I believe it might be worthwhile to expand it somewhat and publish it in book form.

George R. Fann, W9AQC

Fort Wayne, Ind.

Editor, CQ:

. . . I hope you will continue the series in future issues . . .

N. Addison Ball

Annapolis, Md.

Editor, CQ:

. . . I enjoyed "Men of Radio" . . . it makes good reading . . .

Frederick B. Haas, W2SF

New York, N. Y.

Editor, CQ:

I take this opportunity to inform you that I subscribed to *CQ* to read about "ham" radio . . . not to take a history course . . .

O. V. Renaud, W2YHA

Brooklyn, N. Y.

Editor, CQ:

. . . besides the technicalities of radio, there is another important part, i.e., the story of its development and progress. Every person in the field of radio, commercially or otherwise, should be familiar with this . . .

Albert J. Balusek, W5SAH

San Antonio, Tex.

Editor, CQ:

. . . it will inspire the Novice gang by the description of the primitive experiments and everlasting patience and determination . . .

W. E. McNatt, W9NFK

Franklin Park, Ill.

(plus many many more . . . all votes in and counted . . . the series will continue. —Editor)

The High End

Editor, CQ:

This is in reply to the letter from Mr. Sharp, VE3LJ that appeared in the January, 1952 issue of **CQ.**

. . . Mr. Sharp is most right in his stand that unless frequencies are used they may likely be chopped at the next Convention; however, he apparently arrives at this conclusion without full possession of the facts as to why certain segments of the amateur frequencies are unused. From an experience which I consider rather full—for the time covered—I should like to take Mr. Sharp on a lil' journey.

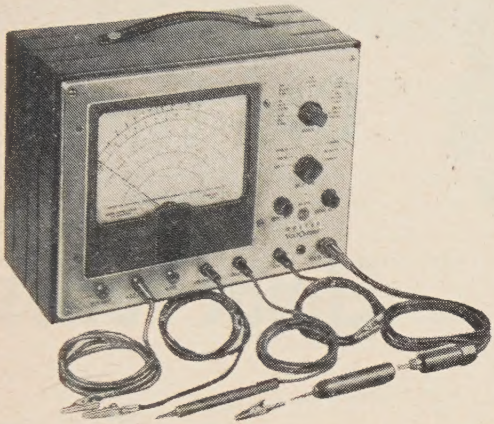
Step 1. Following WW2 there appeared to be an uncommon increase in Phone operation; this led a considerable group of amateurs to advocate the expansion of the 14MC American Phone segment from 14.2 to 14.4. ARRL Directors—surprisingly—received some tremors of this feeling, and while initially took positive action, were later stampeded into rescinding their action at the 1947 Board meeting. Later that year—in December—ARRL Pres. Bailey called the Planning Committee together in New York, and drew up the poll which appeared in the March '48 QST. Although this poll-card was phased in a decided manner to slant the voting along anti-phone-expansion lines, the American Amateur voted overwhelmingly to extend the US Phone band on 20 to 14.4; this, amongst other expansions on 75 'phone.

Step 2. At the 1948 Board meeting, Mr. Sharp's Canadian representative, Mr. Alex Reid, strongly opposed the expansion—in spite of the large American vote favoring same; and did, in fact, give the ARRL Board

(Continued on page 58)

HARVEY

ALWAYS FIRST TO FEATURE THE FINEST



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$112.50

Measures . . . (Full-scale ranges)

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RMS VOLTAGE: 0 to 1.5, 5, 15, 50, 150, 500, 1500 volts
RESISTANCE: 0 to 1000 megohms in seven overlapping ranges
DC CURRENT: 0 to 0.5, 1.5, 5, 15, 50, 150, 500 milliamperes; 0 to 1.5, 15 amperes

FEATURING an 8½" meter, the new WV-87A Master VoltOhmyst is really the master of every testing application. Its peak-to-peak scales are particularly useful for television, radar, and other types of pulse work.

The WV-87A measures dc voltages accurately in high-impedance circuits, even with ac present. It also reads rms values of sine waves and the peak-to-peak values of complex waves or recurrent pulses, even in the presence of dc.

Like all RCA VoltOhmysts, the WV-87A features ±1% multiplier and shunt resistors, a ±2% meter movement, high-input resistance, zero-center scale adjustment for discriminator alignment, dc polarity-reversing switch, and a sturdy metal case for good rf shielding.

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An outstanding feature is its usefulness as a television signal tracer . . . made possible by its high ac input resistance, wide frequency range, and direct reading of peak-to-peak voltages.

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- — Current Cable (Black)
- Ground (Case) Cable

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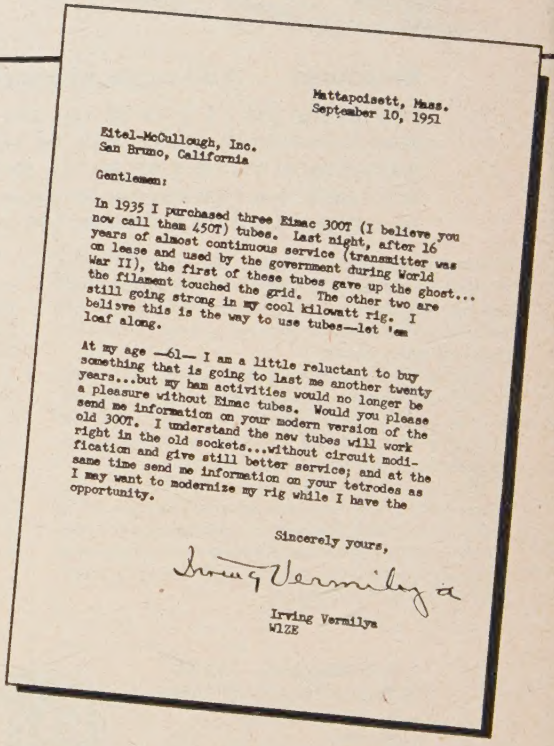
Today Eimac offers a complete line of transmitting power tubes designed by the world's finest tube engineers to last longer and keep your rig on the air at least expense.



Mattapoisett, Mass.
September 10, 1951

Eitel-McCullough, Inc.
San Bruno, California

Gentlemen:

In 1935 I purchased three Eimac 300T (I believe you now call them 450T) tubes. Last night, after 16 years of almost continuous service (transmitter was on lease and used by the government during World War II), the first of these tubes gave up the ghost... the filament touched the grid. The other two are still going strong in my cool kilowatt rig. I believe this is the way to use tubes—let 'em loaf along.

At my age —61— I am a little reluctant to buy something that is going to last me another twenty years...but my ham activities would no longer be a pleasure without Eimac tubes. Would you please send me information on your modern version of the old 300T. I understand the new tubes will work right in the old sockets...without circuit modification and give still better service; and at the same time send me information on your tetrodes as I may want to modernize my rig while I have the opportunity.

Sincerely yours,

Irving Vermilya

Irving Vermilya
W1ZE

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EDITORIAL

WANTED: FAVORABLE NATIONAL PUBLICITY!

As this is being written the past few weeks have proven disastrous to the welfare of the radio amateurs in a number of communities. Extremely unfavorable publicity concerning ham operation has appeared in print. At least one community has enacted a "law" that makes it "unlawful" to create TVI. Another city, has an ordinance that imposes a "special electrical inspection fee" upon all radio amateurs.

As a new editor of a national amateur publication, I am just gaining some insight on the status of amateur affairs. I am immensely surprised at the lack of favorable national publicity to counteract, or at least rectify these erroneous impressions.

The Friday evening copy of the January 18th Oil City BLIZZARD, carried a banner headline "TV Interference Here Blamed on Ham Radios." On the same date a leading TV digest in New York City published an "authoritative" statement that considerable TVI was due to amateur interference. In the Mid-West the City Council of the city of Onawa, Iowa passed their Ordinance No. 114 entitled "An Ordinance Prohibiting Unnecessary Radio and Television Reception Interference, Declaring the Same to be a Nuisance, Providing for Abatement and Prescribing Penalty." This ordinance goes on to state that, "It shall be unlawful for any person to use, operate or maintain any motor, machine, machinery, short-wave transmitter, electrical appliance, or other mechanical or electrical devices or equipment of any nature or description which shall be the direct cause of appreciable radio or television interference."

"Any person who violates . . . shall upon conviction pay a fine not exceeding $100.00 or be imprisoned for a term not exceeding 30 days."

In the case of the Oil City BLIZZARD story the interference is accurately described. Anyone familiar with TV could immediately diagnose the trouble as either diathermy or radiant RF heating equipment. The New York City TVI story has been partially retracted, although not in print. The ordinance now in effect in Onawa, Iowa is an interesting example of a small community, in effect, challenging the authority and prerogative of the Federal Communications Commission. It will probably surprise many of our readers to learn that while we assume the FCC has the overall regulatory powers concerning amateur radio, at least above and beyond the community, city, or state, this particular point has never been adjudicated in the courts!! In other words, while we sit back and smuggly imagine we are protected and responsible only to the FCC, this has never been proven in court and until it is, any community can set themselves up as a radio enforcement body.

Even as the Onawa Ordinance was being passed the editorial pages of the *Passaic Herald-News* carried a piece about the rank discrimination against amateur radio operators which imposed a special electrical inspection fee of receiving $1.50, transmitting $2.50, or both for $4.00! We are given to understand that efforts were made by the Passaic City Fathers to collect this Tariff.

What is this appalling ignorance of amateur radio? Why is this hobby that has clearly and repeatedly demonstrated public service being chose to undergo such outrageous treatment? Regardless of the cause the very presence of this danger indicates that somewhere along the line the national club organization for amateur radio has failed to provide the necessary favorable publicity.

It has failed particularly to reach the level of the TV and radio serviceman. It is here that the amateur can find the root of many of his troubles. Not through intent or with malice, but because of insufficient factual publicity into the proper hands - the ones that install the TV sets.

o.p.f.

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Safety Methods

for Erection of

Beam Poles

A. W. KURTZ, W8ENS*

In publishing this article we have assumed that anyone about to erect a line pole to support his beam antenna is willing to go a little further and check into the engineering aspects of such an undertaking. This article is designed to present a background should your installation ever be questioned by the zoning authorities, etc. —Editor.

Probably much of the current dissention in regard to self-supporting beam assemblies and structures could be avoided if a more considered approach to construction details was adopted by the average amateur. Recognizing that such an approach may not eliminate the last complainant, it will, however, provide sound engineering data on which to discuss the subject with the now important zoning engineer[1]. Such information will also reduce any tendency for these authorities to get out of hand when it is considered that any adverse decision they may render regarding "pole erection" could be applied "en masse" to their local public utilities.

This installation was made in an established residential section and the initial premise was to accomplish ultimate safety with a minimum pole life of sixty years.

Safety Analysis

Referring to the alphabetically arranged notations in *Fig. 1*, the following paragraphs discuss each item in detail with the intention of bringing to the reader a conception of the efforts made to accomplish both of the above objectives.

A—A reasonably straight-grained sixty-foot cedar transformer pole was selected as meeting the requirements for a pole capable of bearing an 800 lb. static top-load. Since the static load would actually

[1] Maurice J. Hindin, W6EUV, "Skywire and the Law," CQ, p. 40, Dec., 1951.

*515 East Grand Ave., Springfield, Ohio

be confined to less than 400 lbs., this was accepted as an adequate margin of safety. In regard to dynamic stress moments, a seventeen inch diameter pole (cedar) has an ultimate failing moment of 155,000 ft-lbs.

Extracting one half of this value as an operating maximum, we have a value slightly in excess of 77,000 ft-lbs. This represents the maximum permissible bending moment the pole can be subjected, at the point where it enters the ground, if we are to maintain a 100% safety factor. Now the elements that determine our wind loading stresses are as follows:

A = Exposed structural area in sq. ft.

VP = Wind velocity pressure in lbs/sq. ft.

L = The lever arm created by the length of the pole. or:

Bending moment = A x VP x L

In our case the beam has a maximum frontal area of 4 sq. ft. We considered the top twenty feet of the pole as being totally and uniformly exposed, this is exaggerated but a safe practice although the exposure is exponential. There is also the point that the surfaces considered are cylindrical, not flat, which keeps us well within conservative values. Structural engineers accept 40 lbs/sq. ft., as the stress on a flat surface resulting from a 100 m.p.h. wind.

Therefore:

Total exposed area	=	24 sq. ft.
Lever arm	=	60 ft.
Wind pressure	=	40 lbs/sq. ft.
24 x 60 x 40	=	57,600 ft/lbs. bending moment

A value well within the safe limit of 77,000 ft./lbs.

Creosote Treatment

While the pole had been given the new chloride treatment and was reasonably well protected, the butt section was the source of some concern since most line poles fail at the point where they enter the ground. In that light, three gallons of creosote were obtained, and after wrapping the lower seven feet of the pole with a layer of rags, the butt was liberally treated with creosote. A small amount of creosote was then periodically applied every second day for a period of two weeks, a total of one gallon and one half being applied in this manner. To permit maximum absorption, the pole was left wrapped for thirty days.

Taking advantage of the concrete base, it will be noted that while a six foot section of the pole is enclosed in the base, only five feet of the pole are below the ground level, which brings up the subject of entrapped fibre length as a factor of safety in pole setting.

Previous study has revealed that the pole could be restrained to ultimate failure in a two foot deep steel jig, however, this entails tremendous gripping pressures which are absent in a normal insertion. Where a pole is damaged, it can be noted in some cases that an older pole tends to break off sharply, while a newer pole feathers out to a long jagged break, clearly exhibiting the fibrous structure. It is this fibrous structure that we depend on for strength. It varies with the age and species of wood. Considering the structural mechanics of a pole planted in earth, which leaves much to be desired due to the wide variation in soils, a median value of depth of planting, equal to ten percent of the length of the pole, has been accepted by public utilities as safe practice. The use of earth-fill provides a semi-resiliant socket, and where violent wind reactions are to be sustained, the pole will move the earth near the top of the fill, forming a large radius, thus distributing the stress over a long fibre path and allowing the pole to bend rather than break.

Lightning Protection

B—To provide for lightning protection, a twelve-foot length of inch and one-half galvanized pipe was driven into the ground, prior to pouring the concrete, until twenty-two inches projected above the ground level. After the pole was set, the pipe was connected to the top of the pole with a #4 AWG solid copper conductor. There is a remote chance that this conductor would not conduct a direct stroke, however, if vaporized, the copper-vapor-path would still be the most conductive path in the vicinity and would prevent the destruction of the pole.

Fungi and Soil Acids

C-D—Alternate layers of gravel and clay are indicated here, and in this section the chief effort to extend the life of the pole will be noted. Most line poles fail from two general causes, 1.) heart rot, and 2.) destruction at the point where they enter the ground by fungi, wood boring insects and organic and inorganic acids in the top-soil. Cedar resists heart-rot since the heart-wood contains and exudes certain water extractives and volatile oils that are toxic to fungi, thereby restricting damage from this source.

Fungi causing exterior damage, come chiefly from the families of Basidiomycetes Fungi, namely, Agaricaceae, Hydnaceae and Thelephoraceae. There is a group of destructive fungi for each species of wood and strange as it may seem, they have little trouble finding the right tree. They are all destroyed, however, by the presence of creosote and other strong preservatives or the action of direct sunlight. Termites, Rhinotermitidae; Powder-post Beetles, Lyctidae; and Carpenter Ants, are the chief wood borers and destroyers of wood. The common habit of these insects is to attack at the ground level where they have the assistance of surface water, the termite boring in the direction of moist surroundings while the beetle bores toward dryer levels. These insects may be repelled by moisture control and the presence of creosote or zinc chloride.

Soil acids may only be combated by completely isolating the pole from this source of damage. It might be felt that at this point it would be wise to place the pole in concrete; however, such is not

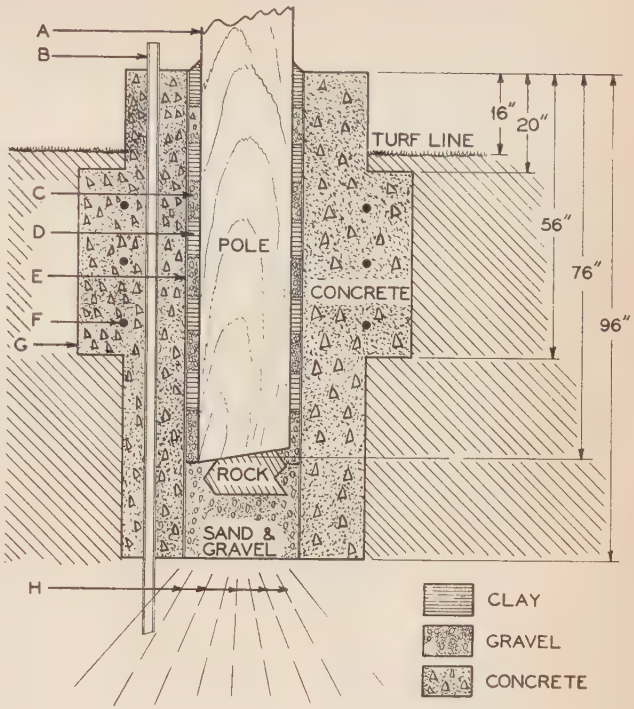

Fig. 1. The line pole is based in about five cubic yards of concrete. Since this weighs nearly ten tons, the center of gravity of the twenty-nine hundred pound pole is one foot beneath the surface.

the case, since mother nature evidently thought of it first for she provided Poria Incrassata, a lusty fungi that thrives as a dry-rot in powder-dry locations. Prescott[2] indicates that fungi will not grow in wood containing less than 20 percent moisture by weight, thus if we reach a nice balance around 15 percent, it is too dry for one and too damp for the other. To meet this demand, the pole was set as shown; the bottom is open to water but the absence of oxygen and nitrogen, in adequate amounts to sustain life at this point, and the presence of a high concentration of creosote, effectively blocks damage.

After the pole was set, fill-earth was selected from the deepest digging of the excavation for its freedom from fungi, organic acids, etc. Initially, five pints of creosote were poured into the opening around the pole, then seven inches of mixed sand and gravel was solidly tamped into the hole. Then, a half pint of creosote was added and seven inches of clay was tamped in with ten foot tamping tools. This process was repeated until the hole was completely filled. Creosote saturated clay was tamped against the pole at the top to repel insects and control the moisture content. The pitch of this tamping can be altered to acquire more or less moisture as required.

Placement

E—Under E, it will be noted that the internal form is fabricated of fifty-gallon oil drums welded together. This provides substantial reinforcing of the concrete, and, is also an indestructible conductor of lightning.

F—Indicated, are the three horizontal rings of one-inch diameter steel for concrete reinforcing. These, with six vertical bars, provide adequate reinforcing of the base. Such reinforcing was included to avoid depending entirely on the earth as a supporting element and to minimize cracking of the base under freezing conditions, the maximum frost line in this latitude being approximately fifty inches.

G—The base contains in excess of five cubic yards of concrete having a compression strength of thirty-five hundred PSI, and weighing to the order of ten tons. Since this is an un-guyed structure, this feature contributes materially to its stability. The pole weighs twenty-nine hundred pounds so the center of gravity is located approximately one foot below the ground level. The upper and lower sections of the base are four feet in diameter and extend six and one half feet below the ground level, while the central section is five and one half feet in diameter and is designed to provide adequate table structure to resist any overturning moment developed by high wind velocities. The upper section was extended sixteen inches above the turf level to block the entrance of surface water and prevent any accidental damage to the pole at the ground level. This type of base also permits the removal and replacement of the pole in case of unforeseen damage.

H—Ten pounds of rock salt were placed in the

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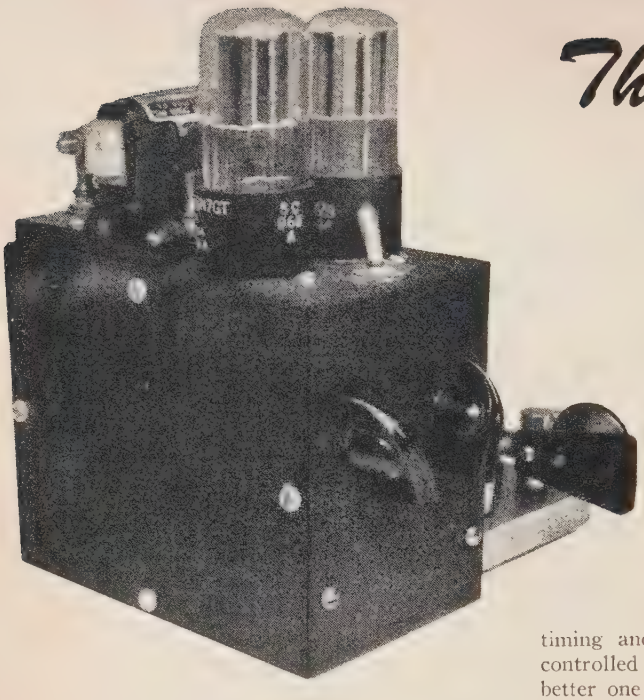
[2] Industrial Microbiology, Prescott and Dunn, McGraw Hill

The Very Electronic Key

G. FRANKLIN MONTGOMERY, W3FQB*



Automatic keys have been described so frequently in amateur publications that a new one must have excellent qualities to merit attention. The key discussed in this article uses a circuit that is simple, and yet it is the equal of older, more elaborate circuits in operation —Editor.

Most present-day electronic keys are variations of the one introduced by Bartlett.[1,2] Their essentials are two relays, one or more tubes to control the relay currents, and a resistance-capacitance timing network. They are capable of fine performance, a fact that is verified by the large number in use. To ensure this performance, however, quality relays of better-than-average mechanical construction must be used, because timing and spacing of the code characters depend partly on the relay characteristics.[3] Since the relays enter into the timing process, the Bartlett key is not strictly electronic in the vacuum-tube sense of the word. In fact, given relays of sufficient quality, it is possible to eliminate the vacuum tubes and produce an automatic key using relays alone.[4,5]

For the amateur who is not equipped with the ultimate in relays, a truly electronic key, in which timing and spacing of the Morse characters are controlled solely by the vacuum tubes, should be the better one to use. Vacuum tubes can perform timing operations very precisely, and a good keying circuit should be able to use a relatively inexpensive relay without degrading this precision. This attitude is reflected in several earlier articles, one of which describes an electronic key with no relay, the output of the character-generating circuit being connected to operate a vacuum-tube keyer directly. But none of these earlier keys produced self-completing characters, a specialty that is regarded as indispensable in any modern automatic key. The circuit to be described combines both functions: the dots and dashes are electronically generated and they are self-completing.

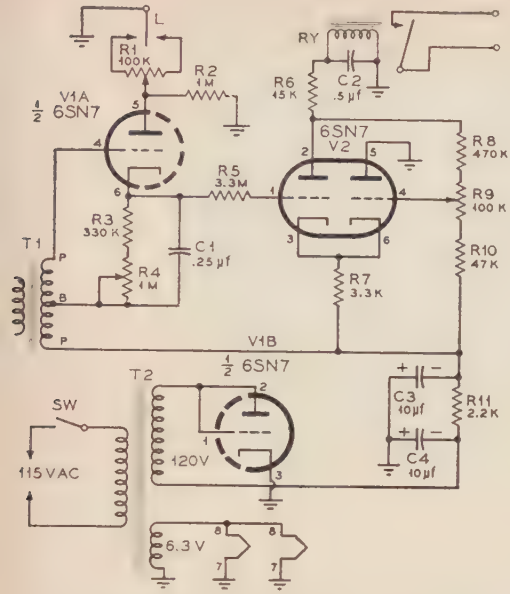
Design Principles

Perhaps the first thing to notice in the circuit diagram of the key is that the positive terminal of the power supply is grounded. This feature is not a necessity, but it does result in a grounded key lever—a useful safety precaution.

Triode *V1A* is connected as a blocking oscillator, using a small audio output transformer as its tuned circuit. When the key lever is closed plate voltage is applied to *V1A*, and a periodic sawtooth voltage waveform will appear at the cathode. For a given setting of speed-control potentiometer *R4*, the frequency and amplitude of this sawtooth waveform will depend on the effective resistance in series with the plate supply to *V1A*. In this particular circuit, the product of sawtooth amplitude and frequency is very nearly constant over a large range of this series resistance. A means of varying the resistance differentially for the dot and dash positions of the key lever is provided in *R1*. It is a simple matter to adjust *R1*

1F. A. Bartlett, "Further Advances in Electronic-Keyer Design," QST, October 1948, p. 27
2F. A. Bartlett, "Compact Automatic Key Design," QST, December 1951, p. 42
3R. E. Brann, "In Search of the Ideal Electronic Key," QST, February 1951, p. 33
4G. F. Montgomery, "Corkey—A Tubeless Automatic Key," QST, November 1950, p. 44
5G. F. Montgomery, "A Simpler Corkey," CQ, March 1951, p. 24
6W. R. De Hart, "A Deluxe Electronic Key," QST, September 1946, p. 17

*4557 So. Chelsea Lane, Bethesda 14, Md.



so that the sawtooth frequency generated in the dot position of the lever will be just twice the frequency generated in the dash position. Once found, this two-to-one ratio of dot frequency to dash frequency will be maintained for any setting of speed control *R4*.

Now, if maximum keying performance is to be obtained from an inexpensive relay, the current used to operate it must be a rectangular wave rather than a sawtooth, and a circuit must be provided to transform each tooth of the sawtooth

Wiring Schematic

C1—.25 μf, 400 v paper
C2—.5 μf, 200 v paper
C3, C4—10 μf, 250 v electrolytic
R1—100,000 ohm potentiometer
R2—1 meg., ½ w
R3—330,000 ohms, ½ w
R4—1 meg. potentiometer, linear taper
R5—3.3 meg., ½ w
R6—15,000 ohms, ½ w
R7—3,300 ohms, ½ w
R8—470,000 ohms, ½ w
R9—100,000 ohm potentiometer
R10—47,000 ohms, ½ w
R11—2,200 ohms, ½ w
T1—Small universal push-pull output transformer (UTC R-59)
T2—120 v power transformer, 6.3 v 1.5 amp. heater winding (Thordarson T-22R12)
RY—3 ma sensitive relay (see text)
V1, V2—6SN7GT
L—Key lever
SW—SPST toggle switch

waveform into a rectangular on-off cycle of current for the relay. This transformation is effected by *V2*, which is connected as an electronic switch (or electronic relay) that operates as follows: When the voltage of grid *(1)* is below a certain critical value, plate *(2)* will draw zero current, corresponding to a space; when the voltage of grid *(1)* exceeds the critical value, plate *(2)* will draw a steady, limited current of several milliamperes, corresponding to a mark. The sawtooth waveform applied to grid *(1)* from the cathode of *V1A* causes *V2* to switch from one to the other of these two conditions each time the waveform passes through the critical voltage.

A convenient way to vary the critical voltage of grid *(1)* is to vary the bias voltage of grid *(4)*, and potentiometer *R9* is provided for this purpose. Resistance *R9* functions as a weighting control,

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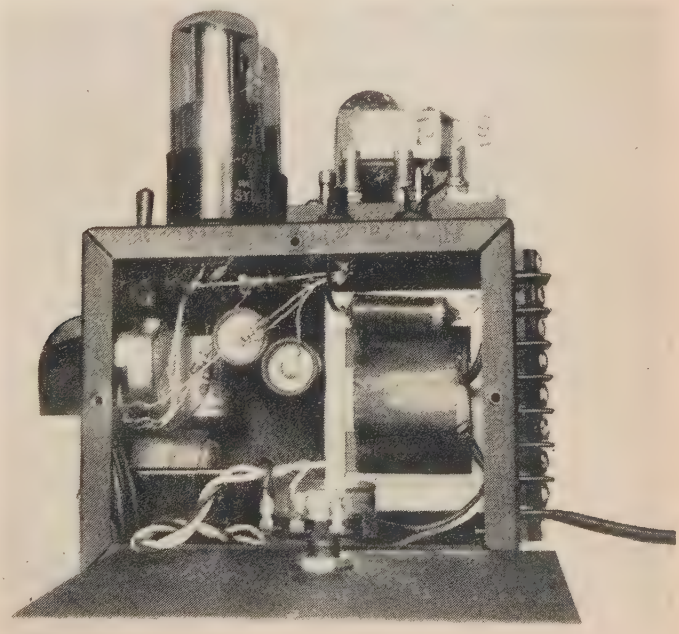
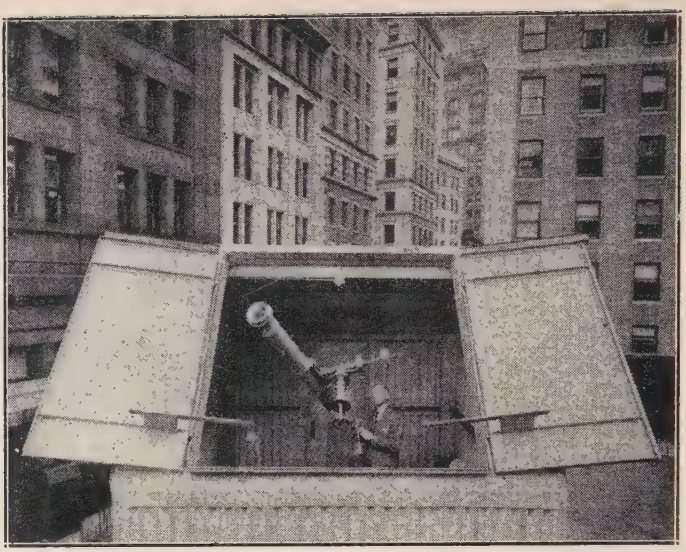


The keyer can be easily mounted in 3 x 4 x 5-inch utility box. The keying level is external in a separate unit. The on-off switch is mounted on top of the box in front of the tubes. The terminal strip in the rear provides connections to the key lever and relay.



Effects of
Planetary Positions
on Radio Signals

J. H. NELSON*

Mr. J. H. Nelson, Shortwave Propagation Analyst for RCA Communications, Inc., New York, has been correlating Shortwave Signal Behavior and Solar activity since 1946. During the past few years he has also correlated Shortwave Signal behavior and Planetary relationships. The following article explains the methods employed in studying the Planets and the results of his research —Editor.

The readers of "CQ" are probably quite familiar with the 11.5 year sunspot cycle and its importance to long distance communication on shortwave radio. The existence of an 11.5 year average cycle in the number of spots that appear on the solar surface has been known for well over 100 years. Numerous attempts have been made by many people to find its cause.

One very logical approach to this problem was an investigation of planetary phenomena as a possible explanation. This approach became especially inviting when it was considered that the length of a sunspot cycle was very close to the period of Jupiter's rotation around the Sun, which was only a fraction of a year different from the average sunspot cycle. Several of the investigators met with very encouraging, but not conclusive, results when the problem was thus studied. They, of course, studied the other planets also and the entire project became very involved.

Since the birth of shortwave radio and its use in international communications we have found, as every amateur knows, that shortwaves do not always work perfectly. The quality of most signal paths undergo a year to year, month to month, and even a day to day variation, sometimes being in difficulties for days at a time.

The cause of this variation was quickly connected with variations in sunspot and other solar activities. In 1946, RCA Communications, Inc. in an effort to develop a means of foreseeing these variations, established an observatory, using a six inch refracting telescope at the headquarters of its Central Radio Office at 66 Broad Street, New York City. Daily observations of sunspots were made here and correlated with existing radio signals.

From this sunspot and shortwave signal research, a valuable and a fairly reliable forecasting service was developed. It was found that the type, age, activity, and positioning of sunspots could be used as a guide to forecasting when correlated with signal behavior that was taking place at the moment. From these data, a forecast for the next twenty-four hours was made.

*RCA Communications, Inc., 66 Broad St., New York, N. Y.

After this method had been in operation for a year or two, it became apparent from occasional failures that there were other forces besides sunspots having an influence upon the earth's ionosphere.

The forecaster, having been an amateur astronomer for many years, was familiar with the research done by astronomers in connection with their efforts to find a planetary influence upon solar activity. In 1948, research on shortwave signal behavior and certain planetary phenomena was started. It was decided that ionospheric variations could provide a much more sensitive instrument for research in this field than the counting of sunspots had provided the earlier researchers.

The planetary positions that were first investigated were the 0°, 90°, 180° and 270° positioning of any two or more planets, in relation to each other, using the Sun as the center of the circle. The planets investigated were Mercury, Venus, Earth. Mars, Jupiter and Saturn, in their order of distance from the Sun. It was soon noticed that with every radio disturbance, there would be two or more planets forming one or more of these angular positions.

This led to intensified research, covering a five year period, in which the dates on which any two or more planets held these relationships to each other were calculated and correlated with signal records for each day throughout the entire five year period. The investigation showed an unmistakable planetary influence upon the ionosphere.

It was noticed that frequently when only two planets held this relationship, there were only slight effects, or no effects at all, but when three or more

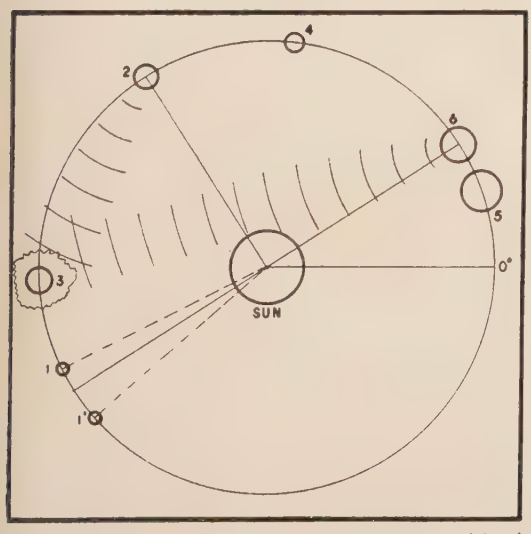


Fig. 1. Planet arrangement during severe storm March 24th to March 31st, 1940. During this period Venus made a 90° with Saturn, and Mercury made a 180° with Saturn and a 90° with Venus. Mercury's speed carried it from 1 to 1' during this period.

1. Mercury—206° + 221°
2. Venus—122.5°
3. Earth—183°
4. Mars—84°
5. Jupiter—20°
6. Saturn—33°

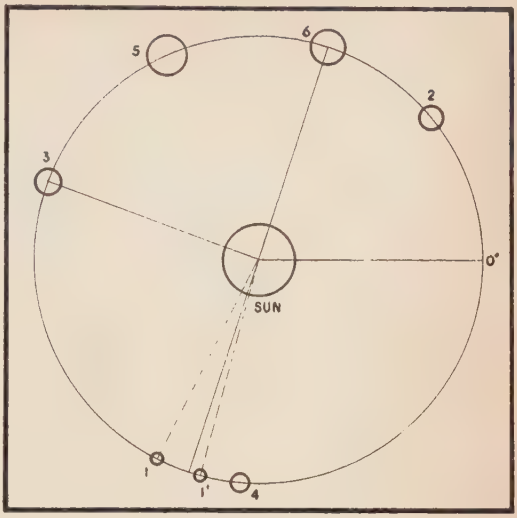


Fig. 2. Planet arrangement during severe storm Feb. 25th to March 5th, 1943. During this period Mercury made a 90° with the Earth, a 180° with Saturn and a 0° with Mars while the Earth was almost 90° ahead of Saturn. Mercury moved from 1 to 1' from Feb. 25th to March 1st.

1. Mercury—242° + 253°
2. Venus—39.5°
3. Earth—159.5°
4. Mars—265.5°
5. Jupiter—114°
6. Saturn—72°

planets were involved, the correlation between planet positions and ionospheric storms was very high. It was further noted that 60° and 120° relationships between planets had the opposite effect of the multiples of 90° relationships.

The two giants of the solar system, Jupiter and Saturn, were found to be very prominent in connection with ionosphere storms. This is quite important because these two planets move very slowly and once they reach a critical relationship to each other, their effects can be noticed for as much as two years. Therefore, when they are separated by 0°, 90°, 180°, or 270° the fast inner planets will make a "double contact" in rapid time sequence (within a few hours in some cases) and thence every time there is a critical relationship between Mercury and Jupiter, there will also be a critical relationship between Mercury and Saturn. This makes a three planet arrangement which is found to be quite "effective."

The past year, 1951, was a very unstable year for shortwave radio communications. The cause of this great change as compared to 1948 and 1949 lies in the arrangement that developed among Jupiter, Saturn, and Uranus which is another slow moving planet. The slow planets, so to speak "set the pace" and determine the average signal qualities for any specific long term period. The severe disturbances come as the fast planets come into configuration with them or with each other. For instance, in 1951, every time Mercury (moving about 4 degrees a day) came to a 0° position with Jupiter, it also

(Continued on page 64)

The PU Expedition

R. W. SCHOENING, PU1TKX*

It all started last March just after the DX contest season had closed and regular meetings of the "Spark City Radio and DX Club" had been resumed. "Aussie" Gates started the whole thing with an idle speculation about field day sites. "HQ" Hanson (he got the name by calling "HQ129X" for an hour one night on 40 when it was actually only a W4 telling about his receiver) suggested a trip to a rare section in order to make our calls more productive. "Alphabetical" Anderson (he spent two and a half years trying to work the country list in alphabetical order before he discovered that some one had been pulling his leg) chimed in with "What's wrong with Clipperton?" and field day was forgotten.

After the fourth round of beer, Clipperton was forgotten, too. It seems that some W6s have an option on all the antenna locations. We didn't reach any decision that night, but the DX-pedition idea is a fascinating one which once started burning

"... his wife and children, with the aid of firemen, had to drag him away from the rig."

can't be quenched by even the thousands of miles of ocean which remain to be traversed. Suggestions kept cropping up: Tanna Tuva, Paracel, Spitzbergen, etc.; all these were vetoed for political or economic reasons. Finally one day Anderson paused between his shack and the mailbox (the only places he ever goes except to club meetings held during ionospheric disturbances) long enough to call me on the phone.

"Just got a country list back from Herb Becker with the letters 'PU' on the bottom," he said, "What country is that?"

"Hold the line," I told him, I should have said "Call me back" since I was calling FB8ZZ at the time, but that would have been poor strategy since even old Alph would have guessed that I was after some DX, and I needed QRM from his three and a half kw rig six blocks away about as badly as I needed the llama's hoof which I brought from "PU".

The "Brittanica" didn't have a line about Torpos Island which we found to be the country assigned the "PU" prefix, and information had to be gathered from DX men around the country. (The new encyclopedia should have the authentic dope, since I have submitted a paper to the National Geographic Society). It turned out that most of the "PU" stations reported had been dutchmen with new bugs. The only station claiming a contact with Torpos Island is a W7, a QSL printer, who has cards from 283 countries even though he spends most of his time on 160 meters. W1FH, W6VFR, and WØYXO all had complete files on Torpos, but oddly enough they all demanded that information which they furnished be memorized and then destroyed to prevent its falling into the hands of the Frankford Radio Club or the Potomac Valley Radio Club.

The form of government in Torpos is somewhat nebulous since there are no people there and no established nation wishes to claim the territory. "UNRIPE" (the United Nations Resources Investigating and Planning Establishment) sent four engineers to Torpos Island in 1949, but upon returning they all resigned and have refused to mention the trip even to their wives.

The only operation on record from "PU" was by a shipwrecked soldier who didn't know the code. In August, 1947, he got a "Mae West" transmitter on 500 kilocycles sending "SOS" automatically. Don Wallace reports that after W6AM stood by this machine always responded with a long dash, but Don doesn't regard this as sufficient response to count as a QSO. W6AM was on 14 mc phone, as usual, but reports are that the usual quota of W6s were zero beat with the "PU" station in spite of his unorthodox frequency. As with all old soldiers, this one (or at any rate his signals) faded away into oblivion after a couple of days of creating chaos throughout the spectrum. A week after the last dot was heard, one W8 was still calling. He had had his meals brought to him during the session, and could have kept on longer except that overheated house wiring started his home burning so his wife and children, with the help of 14 firemen, had to drag him away from the rig. Actually, the wife and children were all for leaving him there, until the newspaper photographers urged them to look heroic.

"PU" seemed like the ideal place for a DX-pedition! The transportation problem was solved

*WØTKX, 3428 5th Ave. S., Minneapolis 8, Minn.

". . . and twelve cases of whiskey (for medicinal purposes) . . ."

by "Aussie", a licensed pilot with his company's plane at his disposal. "I'll tell the company I took a group of Internal Revenue agents to Bermuda for a little vacation," he promised, "Then I can put the whole bill on my expense account."

Anderson, Gates, and myself were selected to make the trip. We decided to take the club's thirty watt field day portable (with pushpull 813s in the final) and the five kilowatt gasoline driven alternator to operate it. The rig, operators, incidentals (such as food), and personal baggage, together with full tanks of gasoline and twelve cases of whiskey (for medicinal purposes) constituted a full load for the large airplane.

We kept our departure secret (quite a trick with all the DX men having widespread intelligence organizations these days) by not including any YLs or XYLs in the plans. Of course, a DX-pedition without women means that only c.w. can be worked since in most cases the signals are so weak that phone is unreadable and the female operators' voices serve to distinguish the DX station from the weaker of the VE's who pile on his frequency. A published notice of our trip in "CQ" would have proved disastrous except that it appeared between a plea for good operating procedures and a warning about high voltage. Of course, nobody read that page.

We departed on the morning of November 17th—the day that a big contest was due to begin. Missing it was just one of the many sacrifices we made in our attempt to become DX. The trip was smooth and uneventful since the plane's transmitter wouldn't work in any of the ham bands. The receiver covered forty, however, and during the evening's contest activities we noticed that the band was a complete mass of unreadable QRM with the exception of three signals which became louder and louder as we moved farther away. These three were W4KFC, W3BES, and W8IOP.

Approaching Torpos Island on Sunday afternoon, the signals became noticeably weaker. At the time we attributed this to normal ionospheric foibles, but actually it was our first indication of a phenomenon of which I will discourse later.

We found a giraffee-like animal that appeared to communicate with his mate without audible sounds, but after setting up our receiver, we found that they actually use a sort of carrier-shift telegraphy between ten and fifteen megacycles (depending on where the animal resonates as a quarter-wave vertical). These conversations are short and infrequent, so no QRM developed—especially after we fired up our transmitter which drove them all to the opposite end of the island.

A hardy species of parrot seemed to be the only bird life on Torpos. We had lots of fun teaching them to whistle code. One in particular became proficient at "CQ", but like other users of that signal he became infatuated with its rhythm and at last count had called 1538 CQ's without signing. The record, I understand, is 1611 and is held by a W2 on forty meters.

Getting down to business, you must be wondering why you didn't hear us; why didn't we work you? This is the strange part of the story, but can be easily confirmed if you have a globe handy.

We called and listened on all bands for a solid week during which good ionospheric conditions were prevalent all over the world, but we didn't hear a single signal and nobody heard us. A little thought before we started could have saved us the entire trip, for the path is obviously next to impossible.

Now take your globe and look at your own location and its antipodes. Trace your beam's frontal lobe along the surface of the earth from your location. The pattern selected—say thirty degrees wide—keeps expanding and covering more territory until it is one quarter of the way around the earth, but look what happens then! The pattern becomes narrower until it is again only the width of the radiator at the antipodes. Naturally, had you been exactly opposite our location on Torpos we could have had a QSO, but brother, it has to be exact, and apparently there aren't any hams in a position to work PU!

It is interesting (but not vital) to note that as your beam pattern extends beyond this point, it widens out again, but now the right-hand side of the transmitted signal is to the left, and vice-versa. With conventional c.w. or double-sideband transmission this makes no difference and "long path" communication is common. Single sideband systems, however, will not work the long way around, since the sideband will be on the wrong side and speech will come out backwards. I don't believe that this problem has previously been analyzed.

(Continued on page 62)

MEN OF RADIO

WILLIAM R. WELLMAN*

PART II

In the previous article in this series, some of the earlier attempts at wireless communication—those prior to 1880—were reviewed. Only one of these had been even an approach to signaling by means of electric waves; at the time the experiment was performed, it had not yet been clearly demonstrated that waves capable of being radiated through space even existed. A small group of scientists, however, believed that such waves really existed and would one day be put to practical use. One of the leading proponents of this idea was Maxwell.

James Clerk Maxwell

James Clerk Maxwell, physicist and writer, was born in Edinburgh, Scotland on November 11, 1831. As a youngster he was rather precocious. His preference for scientific and mathematical study rather than play attracted the attention and ridicule of his friends who regarded him as a bit eccentric and nicknamed him "Dafty".

Heinrich Rudolph Hertz (1857-1894)

It was not until Maxwell began his college work that he gave real evidence of remarkable powers of concentration and scientific thought. He completed his work at the University of Edinburgh and graduated from Cambridge in 1854. After a few years as professor at a college in Aberdeen and at Kings College in London he joined the Cambridge faculty as professor of experimental physics. His research work extended into the fields of heat, principles of dynamics and kinetic theory of gases.

Early in his life he developed an inquiring turn of mind which led him to speculate about many natural phenomena that were often taken for granted by the scientists of his day. One subject of his speculation was the nature and propagation of light. How did light travel from one point to another? Through what kind of medium did it travel? Maxwell asserted that light traveled with a wave-like motion and went on to develop mathematical formulas to prove his theories. He went further and stated that electricity and light were both electro-magnetic; that they were just different manifestations of the same thing. In support of this idea, he called attention to the fact that both traveled at the same speed—about 186,000 miles per second.

Although not a shred of evidence had been found to prove the existence of electrical waves, Maxwell stated that such waves existed, that when discovered they would be found to have a wavelength greater than light waves and that, like light waves, they would be capable of reflection and refraction.

Maxwell's theories remain classics of scientific thought, although they remained unsubstantiated for years after his death, in 1879. By this time, scientists had begun to suspect that electricity was not always a simple, one-directional flow of current. Professor Joseph Henry, an American, had clearly demonstrated that the discharge of a Leyden jar was oscillatory; that is to say, the discharge consisted of a series of current surges in alternate directions. But the final proof of Maxwell's theories, and with it the discovery of radio waves, key to modern communication and entertainment, was the work of Hertz.

Heinrich Rudolph Hertz

Heinrich Rudolph Hertz, who not only discovered radio waves but invented the first practical method of generating them, is probably less well-known than any other great figure in radio, at least insofar as his life outside the laboratory is concerned. This is probably due to the fact that he was very shy and retiring and shunned ostentation and all forms of publicity.

Born on February 22, 1857 in Hamburg, Hertz was the eldest son of thoughtful, considerate parents who were intensely interested in his future. Rather early in life he selected civil engineering as a profession, despite the fact that while still in high school he had developed a passion for pure science. Fortunately, his studies were interrupted by compulsory military service. While still in the army, he had time to think over his choice of a

*20-09 45th St., Long Island City, N. Y.

career and decided that he had made a mistake. He had made up his mind that he could be completely happy only in scientific investigation and he discussed the matter with his parents. They agreed that his future happiness in a profession was of paramount importance, and approved the change in his studies.

Although the course of study selected by young Hertz was very heavy in mathematics and physics, he did not entirely ignore the older, classical type of education then on the way to obsolescence in Germany. He learned to speak both French and English well, and H. Bonfort, in a sketch of Hertz's life published in the *Journal of the Smithsonian Institution* shortly after the scientist's death, noted that he was regarded as a charming conversationalist whether speaking German, French or English. At one time he became interested in the study of Arabic and learned the rudiments of Arabic speech within a short time. He could also read Italian well enough to enjoy classics in that language.

While studying at Munich and Berlin he worked under two of the most famous scientists of that period—Kirchoff and Von Helmholtz. The name of Kirchoff is familiar to most electrical and radio technicians because of his investigations into the laws of current flow; Von Helmholtz conducted extensive research in electricity and optics and invented the ophthalmoscope, an instrument now in universal use in examination of the eye.

Von Helmholtz soon recognized Hertz's superior ability and made him his assistant; it is quite likely that it was he who first implanted in the young scientist's mind the idea of studying electrical waves. Von Helmholtz knew that the Berlin Academy of Science had offered a prize for original research in this field and suggested that Hertz might find it a particularly interesting problem.

The actual work did not begin immediately however; young Hertz had first to establish himself in a position where the facilities of a large, well-equipped laboratory would be made available to him. He accepted a position as an unsalaried professor at the University of Kiel, and during his stay there began seriously to consider Maxwell's theories. He kept a diary, and an entry made under date of January 27, 1884 shows that the train of thought which eventually led to his great discovery had already begun: "Thought about electromagnetic waves. Reflected on electromagnetic theory of light." Although this and other notations show that he was giving serious thought to the problem, actual experimentation did not begin until some time later.

His ability as a college instructor had by this time attracted the attention of German educators, and very soon he was offered, and accepted, a position as full professor at the Polytechnic Institute of Karlsruhe. His stay there was probably the happiest period of his short life. Not only were the surroundings congenial, but an acquaintance with the daughter of a colleague, Professor Doll, ripened into love and culiminated into a happy marriage.

First Experiments

Hertz's earliest experiments in electromagnetics began when, according to the most authoritative sources, he set up and used a pair of Knochenhauer spirals for a laboratory demonstration. The demonstration was probably routine, and involved the use of two pancake-shaped coils of flat metal ribbon, wound in spiral form; the ends of the coils were terminated by small brass balls. He arranged the two spirals on a vertical stand so that their faces were parallel and close to each other.

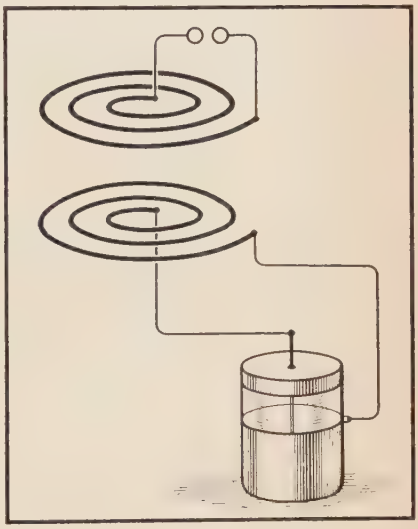


Fig. 1. Circuit used by Hertz to demonstrate electric waves.

When Hertz connected a charged Leyden jar to the terminals of one coil, he was startled to see a spark pass between the free ends of the second coil. The arrangement of his apparatus during this historic experiment was probably similar to that illustrated in *Fig. 1.*

The effect he obtained was not spectacular, for the separation between the spark terminals was not very great; one had to observe closely, because the spark was of short duration and barely visible. But Hertz was impressed by two circumstances: first, there was no apparent physical connection between the two coils, and from this he reasoned that the spark was the result of some kind of invisible wave or vibration passing between the first coil and the second. Clearly, these waves were not light, since there was no visible evidence of its passage, but perhaps they were related to light—the waves described by Maxwell. The second important point was the hope offered for future experiments in the field; although the manifestation was slight, it was true that the original Leyden jar discharge was equally slight.

Further research showed that he had indeed discovered electromagnetic waves — Hertzian waves, to give them their correct designation—but even then their discoverer apparently did not realize the

full implication of his findings, nor was he completely satisfied with the results. He did not visualize his discovery as the basis of a new method of communication and the foundation of a vast group of industries. One Herr Huber felt that perhaps the waves could be used to convey messages and wrote to Hertz asking his views. In his reply, Hertz patiently explained that in his opinion the idea was not practicable because the sending and receiving antennas, in order to resonate to the wavelengths that would have to be employed, would be of immense physical size.

While on the subject of wavelength, it is worth noting that in the course of his work Hertz accomplished a great deal in the field of short-wave generation and propagation. Some of his papers described the investigation of waves as short as thirty centimeters, a short-wave operation even when judged by modern standards.

Observations of Resonance

As his investigation progressed, new apparatus to meet his needs was developed. He soon found that the duration of the received oscillation was too short for satisfactory observation. For a method of generating a more sustained wave he turned to the induction coil, perfected by Daniel Ruhmkorff.

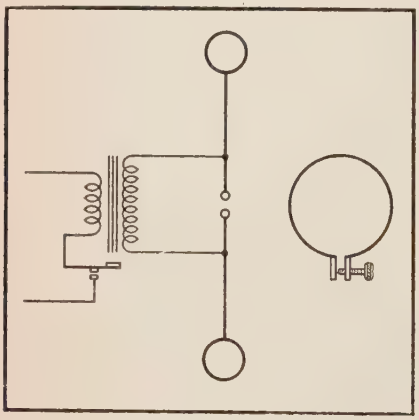


Fig. 2. Circuit used by Hertz to demonstrate resonance.

Next, he observed that improved results were obtained when the transmitting and receiving apparatus were "in tune," or resonance. This was accomplished, in some early experiments, by replacing the Leyden jar with an open spark gap, but later the apparatus that is usually described in science textbooks was evolved. While experimenting with this equipment he discovered the resonant properties of the di-polar, or Hertzian antenna, the forerunner of modern FM and TV aerials. He used two copper rods, each about three feet long; these were placed end to end just like the two elements of a simple FM antenna. The inner ends of the rods were separated a short distance, forming a spark gap. At the outer end of each rod there was a copper sphere, slightly less than a foot in diameter. *Figure 2* shows the general arrangement of apparatus. Tuning was accomplished by varying the length of rod, the diameter of the sphere, or both. Meanwhile, the receiver had been changed also, and now consisted of a simple circle of wire, broken at one point. Located in this break was a micrometer spark gap with a screw for adjustment. The receiver was brought into resonance with the oscillator by changing the diameter of the circular loop of wire.

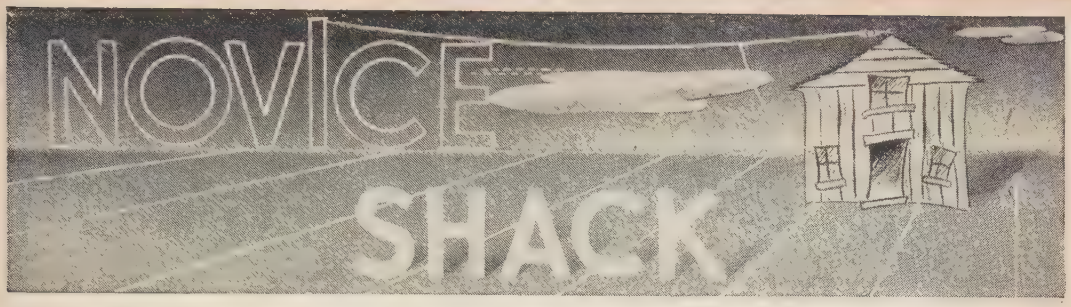
The popular conception of Hertz's work credits him merely with the discovery of radio waves; actually he went much further than this. He not only discovered radio waves, but developed a practicable method of generating them that was used by Marconi and his contemporaries. He proved the truth of Maxwell's theories by measuring the waves, by reflecting them from large metal mirrors and by bending, or refracting them with prisms made of pitch.

When he was sure that he had amassed enough information on the new waves he began the preparation of a series of magnificent papers on the subject. The climax of his career came when he was asked to describe his work before the Congress of German Naturalists assembled at the University of Heidelberg. The reaction to his historic lecture was astounding, not only because of his discoveries but also because of his sincerity and modesty. Here was a man who had made one of the outstanding discoveries of his age, yet was modest enough to say: "I am not able to show you in how many ways the path was prepared for my experiment, and how near several other experimenters came to performing the same experiments themselves." There is little doubt that one of the "other experimenters" referred to by Hertz was Sir Oliver Lodge, who himself had come close to making the great discovery.

Now only 32 years old, Hertz was soon recognized as one of Europe's leading scientists and began to reap a long series of honors and awards. The list was topped by the famous Rumford Medal of the British Royal Society. Hertz might have had his choice of academic posts at any one of Germany's famous universities, but accepted an offer from the University of Bonn, where he became head of the physics department. Had he lived to see the wonder of wireless become a commercial reality, he undoubtedly would have continued to take a leading part in its development. Unfortunately this was not to be; in 1892 he contracted an infection that forced him to take a prolonged leave of absence from his duties. Several operations followed by a long rest apparently put him on the road to recovery, but in the latter part of 1893 he suffered a relapse and the end came on January 1, 1894. Although he had accomplished a great deal in his short life, it is certain that from his point of view, his work had just begun.

When the time came to apply radio to commercial needs, Hertz's transmitting apparatus was used in essentially its original form; in fact, the electric spark remained the sole usable method of gener-

(Continued on page 65)



Conducted by HERB BRIER, W9EGQ*

This month we will review three items of special interest to the Novice. Two of them are courses built around phonograph records and designed to aid one to pass the FCC Novice examination, while the third is an ingenious device that promises to teach the code in fifteen minutes. They are: *PhotoSound Novice Course*, Electronic Technical Institute; *"Private Tutor"* Novice Course, Eldico of New York; and *Philkoda*, Philip W. Miner.

PhotoSound Novice Course

The *PhotoSound Novice Course* consists of twenty 78-RPM records, three booklets and a telegraph key. Thirteen of the records (twenty-six sides) are devoted to the code and the remainder to basic radio theory, amateur operation, Laws, Regulations, and pre-Novice examinations, in conjunction with the instruction booklets.

Basic Theory and Amateur Operation—which includes tuning and operating a transmitter, making contacts, and keeping a log—are illustrated by pictures in the instruction booklets and explained by Bob Becket, the *PhotoSound* instructor, on the records. The third booklet gives instructions for building an 80-meter Novice transmitter and a code-practice oscillator.

Speaking of code-practice oscillators, one of the records included with the course converts a record player into an acceptable substitute. It is a continuous tone record, 900 cps on one side and 1,200 cps on the other. Connecting the key in series with one of the record player's speaker voice-coil leads permits breaking the tone into dots and dashes, ergo: a code-practice set.

*385 Johnson St., Gary, Ind.

A number of examinations, two of them sealed, accompany the course. They are to be completed —one at a time—and sent to E.T.I. for comment and grading. The *PhotoSound Novice Course* sells for $26.95 by Electronic Technical Institute, 769 Venice Blvd., Los Angeles 15, California.

"Private Tutor" Novice Course

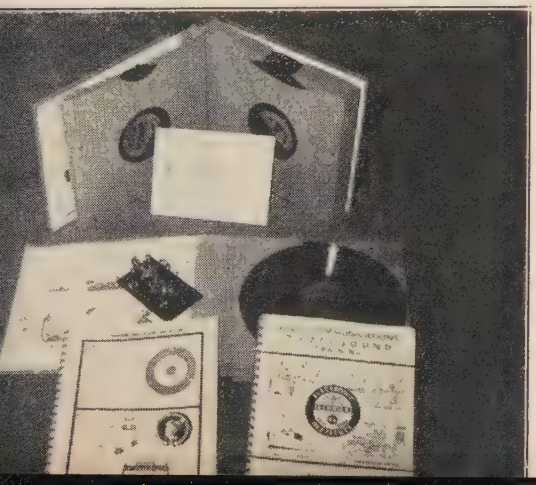
The *"Private Tutor"* Novice Course consists of five "long-play" 33⅓-RPM code records, printed theory lessons, a *License Manual*, an Ohmite Ohm's-Law Calculator, and an IRC Resist-O-Guide. Mrs. Viola Grossman, W2JZX, conducts the code lessons and does an excellent job.

Within their scope, the theory lessons are very complete, and the student who studies them conscientiously and performs the suggested experiments will have no trouble passing the Novice examination. Each lesson is accompanied by a question sheet to be filled in and sent to the dealer from whom the course was purchased. He will grade them and answer reasonable questions.

The *"Private Tutor"* Novice Course sells for $25.00. It is marketed by Eldico of New York, Inc., 44-31 Douglaston Parkway, Douglaston, L. I., N. Y. It may be purchased from Eldico dealers throughout the country.

Both of these courses teach the code in accordance with the latest methods, whereby all learning is by sound. New letters are introduced gradually, but in such order that the student begins to copy actual words almost at once. Every character is properly sent; so the student learns how good code is supposed to sound, and if he follows instructions, he will be able to send the same kind of code.

PhotoSound Novice Course



Private Tutor Novice Course

(Photographs by S. J. Kozan)

The theory lessons probably cover slightly more ground than would be necessary merely to pass the Novice examination; however, the added information will be invaluable in getting on the air and as a basis for studying for a more-advanced license.

In both courses, when the code is sent with pauses between characters, one can faintly hear the letter that is going to come next, like an echo in reverse. This is a natural phenomenon and while I do not know the technical name for it, it happens like this: In recording, the centrifugal force presses the cutting stylus outward against the outer ridge between grooves. Then, when the signal being recorded vibrates the stylus, besides the groove being cut, the entire ridge is displaced outward slightly. When the record is played and the proceeding groove has not been *cut*, the playback needle is acted upon by the displaced ridge, giving a preview of the next groove. The effect is not detrimental and is simply mentioned as a matter of curiosity.

Philkoda

Testimonial letters indicate that many people can actually memorize the code alphabet within fifteen minutes with the help of a *Philkoda*. It consists of a pocket-size cardboard folder, showing the dots and dashes of the alphabet placed in the printed outlines of the corresponding letters, plus a quantity of practice sheets. After studying the position of the dots and dashes in the outline, hearing them is supposed to cause an image of the letter to form in one's mind.

As with all visual systems for learning the code, too much attention to the individual dots and dashes, instead of to the letters they represent, may make it quite difficult to increase one's receiving speed above a few words a minute. I would suggest, therefore, that the *Philkoda* be used sparingly once the alphabet is memorized. After this is accomplished, concentrate on listening to the code and writing the corresponding letters, not the dots and dashes. The *Philkoda* sells for fifty cents and is sold by Philip W. Miner, 11711 Camden Ave., Detroit 13, Mich.

Letters

The response to the January column on communications receivers was very flattering, and I thank all who took the trouble to write and make comments. Jim, WN9PRJ, wrote, "I was given a copy of *CQ*, January, 1952. I enjoyed your *Novice Shack* so much that, come payday, I am going to subscribe to *CQ*. Your article was worth the price of a subscription . . . You talked about poor selectivity and stability—*I know*. I lost four stations in one night because of shifting in my S-19R, caused by vibration of the house and operating table, hi. Well, I couldn't have that; so I took off the knobs and slid rubber grommets over the loose shafts and into the holes in the panel. Next, I put a larger knob (National HRK) on the band-spread control to aid tuning. Last, I added a BC-453 to increase selectivity. Now I can work the boys on the East Coast at 8:00 P.M., when everybody is on the air, and about five guys are on the same frequency."

Jim is using a modified "Command" transmitter, feeding its output through a separate antenna tuner to a Marconi antenna.

Ira, WN2HMR, was brief and to the point. "I didn't realize how much I was missing by not having a better receiver until I heard a good one. Now I am trying to choose between a *Hallicrafters S-76*, a *Hammarlund HQ-129A*, and a *National 125*."

It is a little embarrassing to report the next letter, because I have misplaced the writer's name and address. I hope he writes again. "Mr. X," or WN6??? wrote about his experiments with a balloon-supported antenna. His progress towards WAS (Worked All States) was stymied at twenty-six States, until he used a war-surplus balloon to pull the end of a long-wire antenna into the air. With it he worked four new States in one evening. He woke up the next morning in time to see the balloon explode. One of his neighbors, who had been using it for a target, had just made a "bull's eye!"

Experiments with a balloon- or kite-supported antenna are usually interesting. Different workers report all sorts of results with them. Some have claimed that the balloon or kite was farther away from the transmitter than they could work, and others claim their range was much increased. The *Novice Shack* will be interested in hearing the results of other Novices with such antennas. A word of warning: Be sure there are no high-voltage power lines around for the antenna wire to become entangled in. It might embarrass your survivors at the wake to have to explain that you were out flying a kite when it happened.

Saul Schacket, WN2HNG, and his brother, Bob, WN2HNI, are doing their part in encouraging youngsters to become Novice operators. Saul is the chairman of a Scout Committee and Bob is Assistant Scout Leader. Between them they operate the Radio Patrol of an Explorer unit. So far, six of their Scouts have obtained Novice Licenses, and one has already earned a General-Class license. Several others will take the examination shortly. Certainly a record to be proud of.

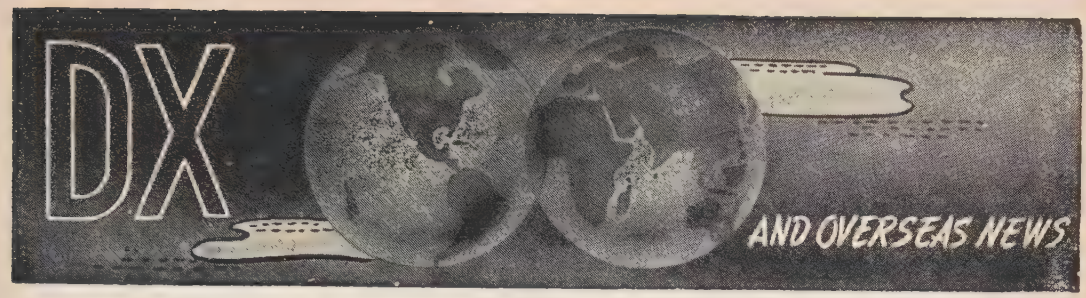
George Graue, W9BKJ, a real old-timer in Fort Wayne, Indiana, has twenty-two Scouts in his Novice Class, which meets every Tuesday evening in his home. Probably, many of his students will be ready for their examination by the time you read this.

WN1TVL, Dave, is another of the many Novice operators who ask high-powered General-Class amateurs to give the Novices a break. He points out that it is hard enough to compete with several other low-power stations on a frequency, without having a couple of high-power stations swoop down on it at thirty-wpm and blot out everyone else.

I hope last month's column will help by prompting amateurs, who operate needlessly between 3,700 and 3,750 kilocycles and unintentionally interfere with low-power Novice operation, to look more carefully before they leap. On the other side of the picture, Novice operators should not be too quick in demanding that only Novices operate between 3,700 and 3,750 kilocycles. Although it is aggravating to suffer interference from stations who can operate anywhere in the band, while you are limited to a few kilocycles, remember there is QRM in the rest of the 3,500-kc band too. Maybe the stations moved above 3,700 kc, because it was the only place where they could find a (comparatively) clear channel. Also, there are traffic nets that have been operating between 3,700 and 3,800 kilocycles for years. Their operation is important, too, and there just is no other place for them to move without interfering with someone else.

As mentioned last month, high receiver selectivity helps in combating interference. And doing part of your operating on the 27-mc and 144-mc bands is worth considering. In next month's column, I intend to discuss the relative advantages of the three Novice bands. Watch for it.

(Continued on page 60)



DICK SPENCELEY, KV4AA*

Our congratulations to the following upon achieving WAZ:

275 **ZL2CU** Colin Bell 40-120
276 **KH6MG** Leo Honea 40-160
277 **W6FHW** Frank Judkins 40-153

We also welcome the following newcomers to the HONOR ROLL:

W4EPA 37-130

We are all familiar with the term "RAT RACE". This phenomena comes into being when a rare DX station suddenly shows up "on freq.". It takes a surprisingly short time for this condition to blossom forth from "zero" to a "full emergency no holds barred" status and goes something like this:

2013 CQ de ZD7XX.

2014 ZD7XX de W1FH . . . or WØYXO . . . or W8JIN . . . or W6ADP . . . or W3GHD et al. (All of these "40-225 up" boys won't be there but regardless of time or frequency, you can bet your boots one of 'em will be on hand!!!)

2017 The above contact goes off smoothly but now the other W boys, alerted by this QSO, have picked themselves off the floor, slewed their v.f.o.s around and things are about to start popping.

2019 ZD7XX now answers one of the fifteen calls thrown at him for QSO No. 2, slightly tarnished with QRM.

2022-2035 This period sees a struggle of giants where two or three of the 4 element kw boys have punctured the opposition by brute force. Reception of ZD7XX was "touch and go" at this point.

2037 We now enter the psychosomatic (I looked that one up) stage fondly known as "RAT RACE", "BRAWL" or what have you. The symptoms are easily recognized and go thusly: About 97 stations are calling ZD7XX, on or very close to "freq". 18 of these have actually heard him the other 79 have taken W1FHs word for it. Many calls are timed to start the split second others finish. This is a nice touch and makes any chances of hearing ZD7XX about as slim as a sleighride in OQ5.

2041 At this point our now slightly befuddled friend at ZD7XX has two choices, he can struggle along, as is, and knock off a few unsatisfactory W QSOs in the next two hours, before things fade out, or, he can QRT and go out and strangle a couple of lions. . . .

Comments are now heard . . . Gosh! did you hear that mess? If I were in ZD7XX's place I'd soon pin them guys' ears back!!!—This thought has appeared to all of us at one time or another, just how slick things would go if we were at the throttle at FS7ZA etc. . . . Well brethren, several determined and able operators have hied themselves to "far away places" with the same idea of maintaining quick and orderly QSOs during their stay. Strangely enough some mysterious malady seems to haunt these spots, usually causing their control of the situation to lapse, with results somewhat paralleling the above. It is, in no way, our intention to belittle the efforts of these stalwarts who have earned our undying gratitude by placing these locations in circulation, but we do feel that strict adherance to a system would have helped things considerably. .

Here's how we would do it . . . Or rather, how we would like to see it done . . . That is!!!

Snapped during WØELAs recent visit to Hong Kong we have L to R, Pat O'Brien, VS6AE, Clyde Norton, WØELA and "Fatty" Fung, VS6CG.

The big day has arrived, after months of preparation we are setting up shop on the little island of "COCOMALA" for a week's stay. We have three xtals, resonating our PP 807s on 14084, 14096 and 14398. The last mentioned being our "hideaway spot" for prearranged skeds for the local gang back home . . . Our first xtal fundamental of 3521 will take care of Gene and Howie!!!—Our first CQ goes like this, "CQ CQ de DX1AA ans betwn 020 and 035." It may take a couple of CQs to get things rolling but roll they will.

Now 5 or 10 kc off freq. is all very well and nice but 40 to 50 kc off—that's for us! . . . Another thing, that QLM stuff is the bunk, it piles everyone up on 14002! . . . We repeat our request to have answers come in on the

Send all contributions to Dick Spenceley, KV4AA, Box 403, St. Thomas, Virgin Islands

W. A. Z. HONOR ROLL

WAZ

CW & PHONE	
W1FH	246
W6VFR	241
W3BES	241
W6ENV	239
WØYXO	237
W6GRL	237
W6ADP	236
W6MEK	236
W3GHD	236
W3CPV	235
G6ZO	234
W3KT	234
W2BXA	233
W6SN	232
W8NBK	232
W8JIN	232
W6SYG	232
W6AM	231
W3EVW	230
G6RH	229
W8BHW	228
W8BRA	228
W6EBG	227
W2AGW	227
W6PFD	226
W3JTC	224
CE3AG	224
W6MX	223
VK3BZ	223
W3LOE	222
W6FSJ	222
W6AMA	222
G4CP	222
W6MVQ	221
VE4RO	220
W6ITA	219
W6DZZ	219
W6TT	218
WØNUC	218
W6PQT	218
WØPNQ	217
W9DUY	217
LU6DJX	217
W7GUI	217
W6TS	216
G2PL	216
W9NDA	216
W2PEO	215
W7AMX	215
W3JNN	215
ZL2GX	215
W3IYE	214
PY1DM	214
ZS2X	214
KH6BA	214
W6OEG	213
W4AIT	213
KH6CT	213
W6SAI	213
W6HX	212
VE7HC	212
W6NNV	211
VK2ACX	211
KH6IJ	211
WØDU	211
W6BPD	210
W6MJB	210
W6PB	210
VK4HR	210
W9VW	209
W6DLY	209
W6GDJ	209
W2AQW	208
W8HGW	208
ZL1HY	208
W6SC	207
W6VE	207
VE7VM	206
W4BPD	206
W6RBQ	206
W6EFM	206
W6KRI	205
DL1FF	205
W6RW	203
W6ZCY	204
W6DI	204
W6PKO	204
VK2DI	204
W6AVM	204
W4CYU	203
ZL1BY	203
W6TI	203
W6RM	202
W6OMC	202
W6AOA	202
G8IG	201
W5GEL	201
W9KOK	200
VK5JS	200
PY1GJ	199
DL7AA	199
W2IOP	197
KH6QH	197
W6BAX	197
PY1AJ	196
W6WB	196
G2FSR	196
W6EPZ	196
OE1CD	196
I1KN	196
W6UCX	195
W5KC	195
G6QB	195
W7OY	194
OK1FF	194
W6GAL	193
W6RLN	193
WØSQO	192
G3DO	192
VK2NS	191
W6EHV	191
W6SRU	190
CE3DZ	190
VK3JE	189
ON4JW	189
WØNTA	188
W8SDR	186
VK6RU	186
W6DFY	186
W2CZO	185
W1AB	185
W6BUD	185
W6IFW	185
W3SA	184
KH6VP	184
W3GAU	183
W2JVU	183
LA7Y	182
WØELA	182
W6LN	181
W6SR	180
W6UHA	179
PY1BG	179
W9VND	178
W7DG	177
WØUOX	177
VK6KW	177
W6UZX	177
CX1FY	176
W6IBD	176
KH6CD	176
VK4EL	176
W6LDD	176
PK4DA	175
W8HUD	175
W6WKU	174
W6CIS	174
W7FZA	174
W6PCS	174
W6KUT	174
W6TZD	173
G5YV	172
OK1LM	172
W6WWQ	172
W6SRF	171
PY1AHL	171
OK1HI	171
VK2HZ	171
W6BAM	170
W7ENW	170
DL1AU	170
W6PZ	169
W5AFX	169
G2VD	169
W6JZP	168
W6ANN	167
VK3CN	167
W6BVM	167
W6DUC	166
KH6MI	166
W6CEM	166
W6JK	165
VE7GI	165
W6LRU	165
W6BZE	165
W6PM	164
W6EAK	163
W6YZU	163
G3GK	163
VE7VO	162
ZS6DW	162
I1IR	162
W6NGA	162
W6NTR	162
W6PDB	161
W4CYY	161
OK1SV	160
VE3EK	160
W6PUY	160
JA2KG	160
W6MHB	160
KH6MG	160

CW & PHONE	
WØFFV	158
W6CYI	157
W7BD	157
WØOUH	157
G3TK	157
W6BUY	157
W6QD	157
ZS6FN	157
W7BE	156
KH6LG	156
VK5KO	155
ZS6A	155
G3AAM	154
G2IO	154
W6ATO	154
W6KEV	153
OK1RW	153
W6IFW	153
G3YF	152
KP6AAA	152
W6RLQ	152
VK2QL	151
W6LEE	150
W6FHE	150
W6EYR	150
W6LER	150
OK1CX	147
W6LS	147
W7KWC	147
KH6PY	147
W7DXZ	146
W6AYZ	146
VE6GD	146
W9NRB	145
W6MUC	145
OK2SO	145
ON4TA	144
G3BI	144
W7LYL	143
W3IXN	141
I1XX	140
W6AOD	140
VK2PV	140
W6ONZ	139
W6ID	138
ZC1CL	138
OK1WX	135
G3AZ	133
W6TEU	133
W6RDR	133
W6AUT	133
WGOBD	131
ZS2CR	131
W6IDZ	130
W6BIL	130
W7ASG	129
W7GBW	127
G8IP	127
G5BJ	126
VK6SA	126
PK6HA	124
G5VU	124
W6NRQ	123
W6MLY	123
ZL1GX	122
VK5MF	121
W6BUO	121
ZL2CU	120
ZS2EC	116
ZS6CT	113
KG6AL	103
W7KWA	98
W6DUB	89
W7IYA	59

39 ZONES

W2NSZ	227
W1ENE	225
W3DPA	224
W5ASG	223
W9RBI	222
F8BS	221
XE1AC	220
W9ANT	218
W2WZ	218
W1JYH	215
W3EPV	214
W3OCU	210
W1BIH	209
W5LVD	209
W2HHF	208
VE3QD	206
W8HFE	205
W8SYC	204
W3DKT	204
W1HX	202
W4GG	202
W9IU	201
W1GKK	201
W2HZY	200
W9LNM	200
W3JKO	200
W9MXX	197

CW & PHONE	
4X4RE	197
W2EMW	195
W9FKC	195
F9EO	193
W2CWE	192
W3KDP	192
W1ZL	192
W4LVV	192
W2AGO	191
OK1VW	190
W2BJ	190
KP4KD	189
WØEYR	186
VE3IJ	186
W7PGS	185
W8RDZ	184
W9TQL	184
W3DRD	183
W4INL	183
VK4FJ	183
W2MEL	183
VE3AAZ	182
W1DQM	181
W2CNT	181
W4RBQ	181
W2RDK	180
W4AZK	180
W9HUZ	180
W5FFW	180
VO6EP	179
GM3CSM	178
W8CVU	172
W4DKA	172
W2RGV	171
W4VE	171
W9LM	170
W6CTL	169
W1NMP	169
W3JTK	169
OZ7EU	169
HC2OT	169
PY2AC	168
W2CYS	167
OE3CC	167
W8IEC	166
W9ABA	163
W4BRB	162
W8VLK	160
W4OM	158
WØAIW	157
I1AY	157
VK4DO	156
DL1AT	156
W9YNB	155
DL1FK	155
W8WWU	155
I1AIV	154
ZS2AT	152
W6LGD	152
G3AKU	150
W6WO	150
VE7VC	150
G6QX	150
SM5WI	148
W2GUR	146
OK1AW	144
W6KYV	143
TF3EA	142
VS7NX	140
W9NZZ	139
W6KYT	135
W7HXG	134
VE7KC	133
W7ETK	132
W6TE	131
W6WJX	131
W7BTH	131
CR9AH	131
W5CPI	130
W6NZ	129
KL7UM	129
OE3CC	128
DL1DA	127
W6EYC	126
W6MUF	125
VR5PL	124
KG6GD	121
DL3DU	118
W6NRZ	117
W6JWL	114
KL7GG	114
W6FBC	114
W6VAT	110
DL3AB	107
W7GXA	105
W6LEV	103
W7LEE	91

38 ZONES

W2HMJ	199
CM2SW	183
W2PUD	181
W8KPL	173

CW & PHONE	
W8FJN	173
W5KUJ	171
W2SHZ	169
W2GVZ	165
GM2UU	165
WOTKX	164
J1UV	160
SM7MS	159
ZL3CC	159
VE2BV	159
W8EYE	158
W3LVJ	158
W2UEI	156
W3FYS	156
LU7CD	155
W5MET	150
W8ZMC	143
WOAZT	143
ZL3AB	143
WØRBA	140
W6ETJ	139
W9FKH	135
VE3ACS	134
TF3SF	134
MP4BAD	133
W4FPK	131
W2PQJ	130
W4LQN	130
W3ZN	129
W9MZP	126
FE8AB	126
W9TB	122
GW4CX	120
EA1AB	119
WØFET	118
KL7PJ	117
W6CAE	113
W7EYS	107
VK6DX	103
W6FXL	92
C1CH	84

37 ZONES

W1KFV	173
W1HA	172
W2ZA	160
IS1AHK	160
W1BFT	159
W2WC	158
W3WU	157
F9AH	153
W4IWO	149
OZ7BG	144
W9WCE	142
W4ML	140
OE1FF	136
W2AYJ	133
W1APA	131
W7HKT	130
W4EPA	130
W4DIA	129
VE5JV	126
W9LNH	122
VE1EA	116
G3BPP	112
W6AX	110
WØFWW	108
OH3OE	108
W7PK	104
W8HSW	104
W2BLS	99
W6WWW	99
KL7KV	88

36 ZONES

W4HA	169
W2OST	163
W3MZE	141
I1IT	140
WØCU	139
W9LI	131
OA4AK	128
VE1PQ	128
I1IZ	128
W3AYS	124
F8TM	124
W2BF	115
AX4BX	112
W5CD	108
W2JA	102

35 ZONES

W5JUF	183
W1DEP	159
W5FXN	143
W4DHZ	132
W9CKP	132
W1MRP	130
ZL1QW	123
OE5YL	122
W1RAN	122
W6ZZ	121
W9RQM	119
CO6AJ	119
W9DGA	115

CW & PHONE	
W9FNR	114
W8AVB	113
WØGBJ	113
W2HAZ	111
KZ5IP	108
KL7CZ	80

PHONE ONLY

39 ZONES

VQ4ERR	213
XE1AC	212
W3LTU	206
W6DI	192
W6VFR	175
PK4DA	175
G8IG	169
W7HTB	161
W8HUD	161
F9BO	150
VE7ZM	145
DL1FK	125

38 ZONES

W9RBI	195
W2BXA	192
W9NDA	173
W6KQY	161
W4CYU	160
W6AM	160
ZL1HY	157
W1HKK	153

37 ZONES

W1JCX	189
W3BES	186
W8REU	176
VK3BZ	173
G3DO	164
W3GHD	164
CE3AB	163
W9HB	161
W7MBX	158
GM2UU	158
W6WNH	157
W6BXH	153
W3JNN	150
W8BF	146
W6TT	143
F8VC	124
W7MBW	107
C1CH	83

36 ZONES

W1NWO	187
W1MCW	184
ZS6Q	173
W1BEQ	164
W4ESP	154
W2DYR	140
W9BZB	139
W9HP	139
W8AUP	131
W8PDB	130
VE3BNQ	130
W4INL	129
W1FJN	128
G6BW	127
VE7HC	123
WØHX	120
W8CYL	112
W3DHM	96
W6SA	92
F8DC	87

35 ZONES

HC2JR	171
W4HA	162
W9RNX	153
W6PCK	148
W3EVW	148
W9BVX	148
W2GHV	137
W2RGV	136
W6CHV	135
WØPUE	135
HC2OT	134
WØEYR	131
WØANF	130
WØPRZ	124
W9CKP	124
G8QX	123
W8ZMC	122
W5LWV	108
W4OM	106
W3PA	105
PY2JU	103

34 ZONES

W5ASG	155
W3KT	153
W5JUF	148
I1AXD	130
YV5AB	129
LU8CW	129
W2ZVS	128
W5KC	125
W4LZM	124
W6UZX	123

desired frequency range every couple of minutes, this gives newcomers the low down . . . We don't QSO stations calling on the exact frequency of our last contact, this keeps the situation fluid . . . That 15 kc receiving range gives us a nice stretching space to pick and choose relatively "QRM free" calls . . . Should we be informed by our contacts that QRM is heavy on our frequency we can pull a quick double shift to the left with our other xtal. and vice versa . . . Stations calling us should make mention of our frequency thus helping others who might otherwise be dashing madly around trying to locate us. This is very serious business and QSOs should be limited to a bare RST report. You don't want our name, QTH or power, you just want our QSL and a simple RST report will do the trick. The grapevine will speed you all details later on . . . In DX contests contacts zip along at one per minute during rush hours, why not make it the same way??? . . . A few hours of this and pile-ups melt away like hot butter leaving room for many more QSOs . . . We have recess periods too, each half hour we QRX for five minutes. This allows blood pressures to descend on a world-wide basis!! . . . When we finally sign off for the day we let the gang know at what hour we will be on again or, better yet, we have regular daily/nightly operating periods which we make known and religiously keep. . . . This is a rigid sked but, by golly, if stuck to it should bear fruit . . . What do you think???? . . .

At Time of Writing

Interest seems to be centered around the following: The **EA8AW** jaunt to RIO DE ORO. He was expected here around Jan. 25th and after a possible week's stay he will continue on to IFNI. While EA8AW is A3 only, we hear that c.w. will also be heard. Calls, EA9DC/EA9DR . . .

Information on **VU5AB**, Nicobar Islands, has been very sketchy but it is believed he was on 7015 kc week of Jan. 14th . . . also, no reports, as yet on **VU5DR**, slated to be active in the Andaman Islands weekend of Jan. 20th . . . Fairly complete dope is in on **ZS2MI**, Marion Island, Van is a commercial op, new to ham radio, he will be on the job until April. Most QSOs have been by phone but c.w. operation is increasing. Look for him as follows: Between 1700 and 2000Z on either 350/180 A3 or near 14050 daily and every other Sunday starting Feb. 24th. All QSLs go to ZS6BW, A. Sachs, Box 256, Bryansten, Johannesburg, Union of South Africa, who will answer upon receipt of same . . . Two stations are active on Jan Mayen, **LB6XD** and **LB6ZD**, 022, 2200Z . . . **9B3AA** has been active again. QTH Bulgaria.

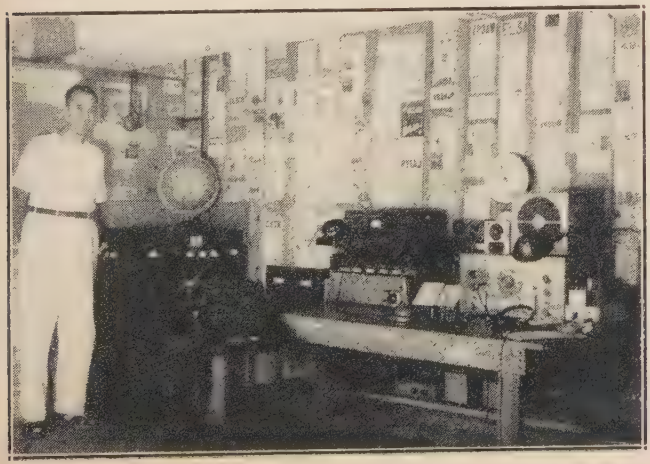
The **XE4PK/XE1PB** expedition to the Revillagigedo Islands has been delayed for a period of from one to three months. XE1AC tells us that XE1FK was all set to go but decided to postpone the trip until the question of whether or not these islands would constitute a "new" country had been definitely decided. XE1AC has visited ARRL to discuss this matter and assures us, should a favorable decision be reached, there will be plenty of ham activity there. Al expressed the desire to make the trip himself during the summer which will be good news for the A3 gang. It seems reasonable to the writer that the Revillagigedos should be counted separately when the following facts are considered: (a) They enjoy a similar relation to Mexico as Cocos (TI9) does to Costa Rica. (b) The Mexican Govt has seen fit to bestow an XE4 prefix to this group which would ordinarily come under XE3.

ZD9AA, in a letter to W6AM, advises he should be on with a small 20 watt phone/c.w. rig shortly. Red desires self-addressed envelopes to accompany QSLs as envelopes are at a premium on this "Loneliest island in the world" . . . Tristan da Cuhna will be having postage stamps after Jan. 1st 1952 which should interest you stamp collectors . . . **VK2VN** plans possible operation from Labuan, Sarawak and the Cocos Group (ZC2) Hope can do Morrie!!! . . . Our fingers are crossed on several W QSOs with **ZC3AX** and **ZA1AB**, let us know if any QSLs show up . . . **4UAJ** has been showing up Sats. 1200 with a very healthy signal. Ted runs 700 watts from a 250TH driven by PP 807s 082 kc. QTH Kashmir. **4UAK**, QTH Pakistan. The 4UA series calls are designated for United Nations use . . . **VQ2AB** speaks of an expedition to Khartum (Sudan) for observation of the suns eclipse in FEB. they are using a prefix AJ4!!!

DX & DX'ers

W1QF has new TV proof rig using a 4/125A . . . **WØAZT**, after an inactive period, grabbed FR7ZA and VU2EJ . . . **W3AYS** is now back in Md. after a two year stint at W8EBC . . . **W1FH** had a nice Xmas gift, namely FL8BC, making it 246 for Chas . . . **VQ1RF** did a bang up job in Zanzibar and things really started moving on the c.w. end when VQ3/4KIF dropped in . . . **W9JUO** snagged VP4CQ on 7001 for No.74 . . . **W6AM** hooked ZA1AB and MP4BBD for 232/233, nice going Don . . . **VE3LJ** added Zone 28 with VK9XK while W8ZY QSO'd VP5BH, **EAØAD** and ZD6HN, this makes Karl 235 . . . **VP5BH** was also added to the lists at W2CTO and W7GUI . . . **W2WZ** rang the bell at ZS2MI for No. 219 . . . **W6GDJ** added **EAØAB** for 209 . . . **W7OY** hooked VQ3BM and KH6QY/KC6, the latter is awaiting his new KC6 call at Ponape. Eddie bemoans the east coast QRM on such as VS9AM, EA9AP and ZS2MI . . . **ZD4AB** may go to ZD2 in a couple of months leaving ZD4AX, AB and BF (all A3) to hold the fort . . . **G3BAF** now turns up at ZE4JX . . . **W5JC** was very happy to get QSL from C9AM . . . Now that CM2SW's XYL has fully recovered from illness, Sergio advises he now will be heard from again . . . **W1MCW** comes through with ZS2MI, ZS7C and VQ1RF, nice going Mrs. Lou.

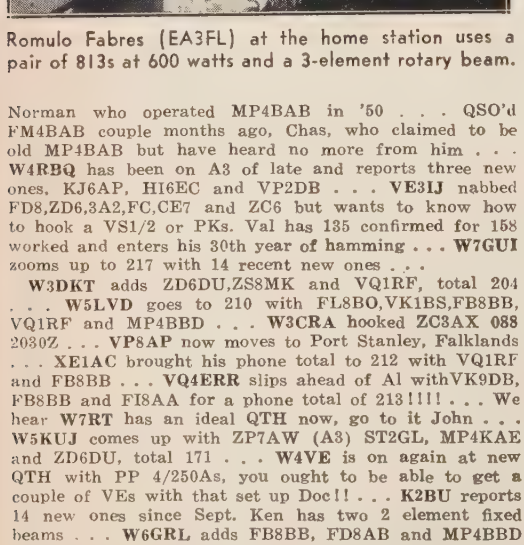
W2GNQ reports Asians coming through around 7 p.m. Doc worked JA2KG, JA2MI and KR6AF . . . G6QX nabbed zone 39. **FB8ZZ**, for his 39th Zone, Bob, quoting G2MI says you can regard 3.5 mc sigs of VQ1RF, VS7NG, VR2CJ and VP8AK as phonies unless, of course, the QSL comes thru . . . **W6SAI** finally made WAC on 80 QSOing G6ZO, G5LI and G3BOF . . . **W1FH** reports QSO with MC1WN, see QTHs . . . **W2GVZ** added EAØAB and



Here is the neat set-up at W9FKC, Myron Hexter, Ravinia, Ill. He needs no introduction to DXers. Most of the gear can be identified by sight.

VK9XK bringing Pat up to 165 . . . **W2WZ** pulled in CR8A, VP8AT, VQ1RF and, at long last, ZS8MK . . . **W4LDM** should be all set in TA3 by now . . . **DU1MC** dropped in on W2UNR repaying Hals' visit of last year . . . **FY8YB** says QSL via W9AND, this contradicts the QTH of Uleta, Fla. given previously . . . **W4KE** reports QSO's with VQ4RF, ZE4JC, CR5AD, ZS5AM and VP4LZ on 14 mc . . . W9RBI, W1JCX, W1NWO and W2APU are supplying QSL cards for ZS2MI via ZS6BW . . **W4RBQ** nabbed ZC4XP on a blind call!! How lucky can you get Buck?? . . . **F8BS** advises QSLs from FB8ZZ will be coming through for all "avec patience". Also that **FU8AA** has arrived at Ile de Pentecote and should be heard from soon . . . **JAØIJ** has been heard 1100Z 082 (Iwo Jima).

The Yacht "Yankee" arrives in Capetown Jan. 22nd bearing W5HBM homeward bound from **VQ1RF**. We understand that ZD7 and ZD8 are on the "Yankees'" itinerary and we hope Morgan can do something about it!!! . . . **VK2PV** was very happy with VP7NM QSO, congrats Pete, yes a beam will make a big diff . . . **GM3CSM** writes that several FI8RO QSLs have been returned marked 'unknown'. Ian needs **FY8AC** card for full D.U.F., he also reports hearing an EA4 stn of "too fast dots" fame signing a ZC3 call then finally coming through with his own call!! Ian hears both coasts coming through around 2200/2300Z with W6BAX, W7GUI and W7OY outstanding. Just recd my YN3AG card here so they are coming through . . . **W2APU** would like whereabouts of



Romulo Fabres (EA3FL) at the home station uses a pair of 813s at 600 watts and a 3-element rotary beam.

Norman who operated MP4BAB in '50 . . . QSO'd FM4BAB couple months ago, Chas, who claimed to be old MP4BAB but have heard no more from him . . . **W4RBQ** has been on A3 of late and reports three new ones, KJ6AP, HI6EC and VP2DB . . . **VE3IJ** nabbed FD8,ZD6,3A2,FC,CE7 and ZC6 but wants to know how to hook a VS1/2 or PKs. Val has 135 confirmed for 158 worked and enters his 30th year of hamming . . . **W7GUI** zooms up to 217 with 14 recent new ones . . .

W3DKT adds ZD6DU,ZS8MK and VQ1RF, total 204 . . . **W5LVD** goes to 210 with FL8BO,VK1BS,FB8BB, VQ1RF and MP4BBD . . . **W3CRA** hooked ZC3AX 088 2030Z . . . **VP8AP** now moves to Port Stanley, Falklands . . . **XE1AC** brought his phone total to 212 with VQ1RF and FB8BB . . . **VQ4ERR** slips ahead of Al withVK9DB, FB8BB and FI8AA for a phone total of 213!!!! . . . We hear **W7RT** has an ideal QTH now, go to it John . . . **W5KUJ** comes up with ZP7AW (A3) ST2GL, MP4KAE and ZD6DU, total 171 . . . **W4VE** is on again at new QTH with PP 4/250As, you ought to be able to get a couple of VEs with that set up Doc!! . . . **K2BU** reports 14 new ones since Sept. Ken has two 2 element fixed beams . . . **W6GRL** adds FB8BB, FD8AB and MP4BBD for 237, nice extractions Doc . . . **W6MEK** pulled in FD8AB,FB8BB,LB6ZD and ZA1AB. The latter gives his QTH as "Berat", name Don and power 100 w. He was also worked by W6AM,W6SR and W2UNR . . . **W1HX** arrived at 204 with LZ1LZ,PX1AA and VQ1RF . . . **W1RAN** finished up a TVI proof final during Xmas holidays and went to 125 with EAØAB, VP2AF and SU1AO . . . **4X4RE** boosted himself to 39-197 with 13 new ones, We can't allow VR7AA Egon . . . **W6IFW** made it 185 with FB8BB and CR5AD while GM2UU finally got Zone 39 with FR7ZA A3 and then was happy to hear ZS7C calling him for another new one!!! . . . **W6ENV** adds one with FD8AB while W6EHV, now KG4AF, gets overdue credit for OY5EL . . . **W5ASG** hooked VK1WO and MP4BBD which makes Bill 223 now . . . For possible enlightenment to some here follows the Windward vs. Leeward Island set up—

Windwards	Leewards
Dominica VP2D—	Antigua VP2A—
Grenada VP2G—	Montserrat VP2H—
St. Lucia VP2L—	St. Kitts VP2K—
St. Vincent VP2S—	Anguilla VP2—

Here and There

VP3VN, Vasco, advises us of the following VP3 activity: VP3CW, Ting, active mostly on 28 A3. VP3LF, Louis, active 14MC A3 only. VP3TY, Tony, active on 14 c.w. only. VP3FJ, Frank, inactive at present. VP3YG, Des, 14 A1/3 been off last couple of months. VP3VN may be found on 14 c.w. 082 . . . **F7AT**, ex 3A2AG, DL4FA, PX1AR, will QRT soon and reopen at WØ and then at W6. Warren claims first 3A2/3A2 QSO when, as 3A2AG he hooked 3A2AN (HC1FG) !!! Any missing QSLs may be had by sending details to WØHZA . . . **W6AM** received the new "Amateur Extra Class License" on Jan. 2nd under the "Grandfather" clause. Don held 60C in 1913. That should be Great-Grandpappy, I didn't know the Russians had "invented" radio by then even!!!!! . . .

ZS6XQ, Louis, and mother have now arrived back in ZS land and 6XQ will be back on the air shortly. Louis had been undergoing medical treatment in the States and we are happy to say his condition has shown improvement. The ZS6XQ fund, expected to reach around $100 was oversubscribed 200% by 147 ham contributors and Louis was given a royal sendoff and presented with a Recorder, Record Player, QSLs and other items on his departure from W1. Our "WELL DONE" on this fine example of ham spirit goes to all parties concerned . . . The gang will regret to hear of the passing of Al Whetham, **VE3BNQ**, one of Canada's most ardent DXers. We also are sorry to record the sudden passing of **W1GZ** on Xmas . . . **W2SUC/KL7** advises us he operated SVØUN from Sept '50 until Feb. '51 and SVØAB from Feb. '51 until July '51. Any missing QSLs for that period may be applied for at W2KUC home QTH. SVØUN was licensed by the Greek Govt for use by any U.N. radio personnel and, thus, operators not familiar with ham QSL procedure may have made unconfirmed contacts outside of the period mentioned above.

I note the **Honor Roll** was not published in the Feb. issue as promised. This was due to lack of space. My sincere thanks go to the many who have sent me their congratulations and well wishes on the new job here. I'll do my doggonedest to keep it interesting . . . We would appreciate being given, or loaned, any interesting photos of DX stuff . . .

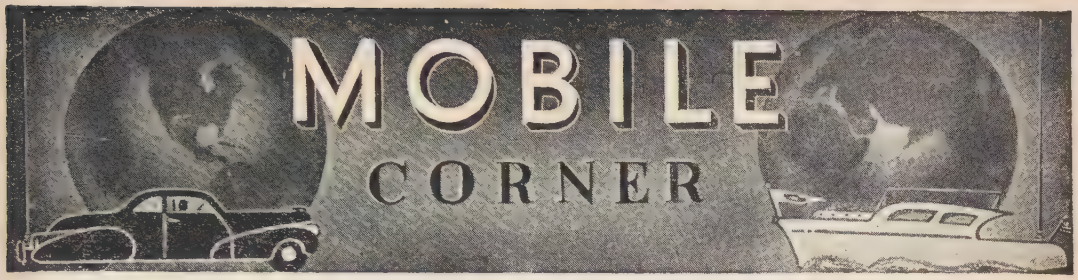
On 160

Our congratulations on the persistent efforts of Mac W9CVQ and John ZL1AH for their 160 meter QSO.

First overseas QSO, for the season, goes to VE1EA and G3PU on Nov. 25th. A brief resume of the Jan. 6th tests showed conditions rather poor with high static level. In spite of this GW3ZV made contacts with W1BB, W1SS and W1LYV. W1LYV QSO'd G2AJ, G5PU, G2PL and exchanged a "touch and go" report with EK1KM (EK1CW). Heard in the Virgin Islands were GW3ZV 459, W1SS 579, W1AHX 578, W2WWP 579, M3DFY 589, W3PYR 569, W8PIH 589. QSO'd by KV4AA were: W1BB 589, W1LYV 579, W2QOS 579, W3KWA 579, W3OKU 479, W8BKH 579, W8LJH 479 (ten watts) W8LJH A3 (7 watts to a 6V6) 24, W8RRA 588, W9KPZ 589, W9RH 579 and WØNWX (27 watts) 569.

January 20th tests: Incomplete results in but con-

(Continued on page 54)



Conducted by RALPH V. ANDERSON, W3NL*

CAP Amateur Exercise

Do you want an activity for your mobile club which will provide a lot of fun and at the same time serve a useful purpose? If so, an exercise with the Civil Air Patrol is recommended. These pilots are, in a sense, amateur aviators the same as hams are amateur radio operators and in many cases, they have related problems.

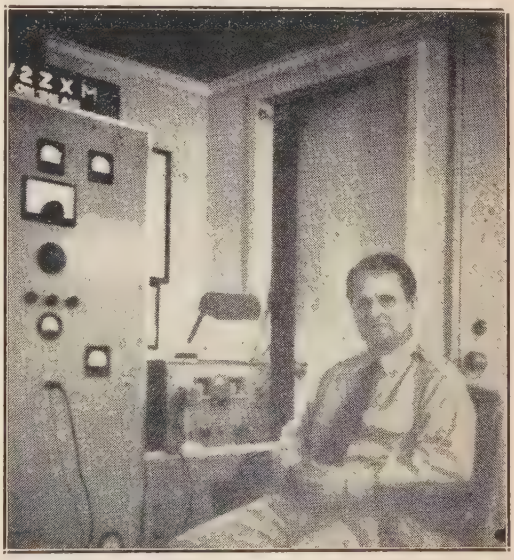
The CAP is supposed to have their own communications. In some cases the communications are complete and there is no need for auxiliary communications. In other cases however, radio equipment is lacking entirely or is in poor operating condition due to many factors. Amateur radio can be used as a supplemental means of communication in such cases.

A CAP exercise in which a lost (or crashed) plane is simulated is a perfect use for mobile communications. The lost plane is simulated by certain markings on the ground and it is up to the CAP planes to find it by following a search plan. Once found, it is up to the pilot to get word back to the headquarters. A mobile in the vicinity, suitably marked so he can be identified from the air as such, can furnish information to the headquarters immediately. Practically none of the search planes have radio by means of which this report can be transmitted. Ground rescue teams start into the area as soon as the plane is reported lost so that by the time the plane is found, they are dispersed over a wide area. Mobiles operate with each ground rescue team to provide the proper link to the base.

Mobile or portable stations are set up at the various base stations. In a search problem, there are quite a number of bases, possibly ten or more, and these must all have communications. In a local problem recently observed about 35 stations were required.

Communications were paralleled. In a few bases, CAP communications were good and because of the extra relay involved, ham messages lagged in delivery. These people couldn't quite see the necessity of ham radio. Ground rescue teams and other bases however, were entirely dependent on ham radio or "Mr. Bell" and were tremendously impressed with the efficiency of amateur mobile communications. In this case the lost plane location was such that the entire operation would have been a failure without amateur radio.

A couple of legalities: Under certain conditions, the basic factor of which seems to be whether the activity is an "official" CAP exercise, it is legally possible for hams to work CAP stations cross-band. If the exercise is planned enough ahead, cross-band communications would speed up delivery of messages. The CAP offers to reimburse mobiles for gasoline used. A call to the local FCC provided the unofficial answer that it had been ruled in the past that acceptance of remuneration for gasoline thus used was indirect compensation and thus it was not legal for the amateur to accept it.



Probably the Worlds' best known Maritime Mobile Captain Kurt Carlsen.

A CAP/Amateur activity is highly recommended as an exercise that is different, interesting and worthwhile. It prepares a mobile organization to handle an actual emergency. We'd like to hear from any clubs who have undertaken such an activity.

Maritime Mobile Amateur Radio Club

Fixed stations: Send your 30 QSL's to the Secy, W3OB, for the MM certificate. Quite possibly the most important MM item of the month is the Flying Enterprise and W2ZXM, Kurt Carlsen the skipper. It is not generally known that a great many of the amateur stations aboard ships are *not* those of the Radio operator. It has been estimated that almost

(Continued on page 59)

**Send contributions to R. V. Anderson, 2509 32nd St., S.E., Washington 20, D. C.*

Conducted by LOUISA B. SANDO, W5RZJ*

Congratulations to W3UUG, W1FTJ and W3OQF as the three top winners in the phone section of the YLRL 12th Anniversary Party held in December, and to W1FTJ, W3JSH and W9JTX for hitting the top three spots in the CW section. Dot came very close to making first in both sections! Miriam, who eased ahead by 320 points in the phone section, now receives the gold loving cup, donated by W1MCW, for the second year. Dot, winning handily in the CW section, also holds onto the first prize, the silver loving cup donated by W4HWR, for the second straight year. All of the girls reported that conditions were far from good, and this can well be shown in noting last year's scores in which W3UUG rolled up 11,180 points to win, compared with this year's 3,684. Judging from the scores, apparently many of the YLs participating didn't "bother" to send in their logs, but here are the scores of those who did.

	Phone			CW	
W3UUG	3684		W1FTJ	2880	
W1FTJ	3364		W3JSH	1501	
W3OQF	2424	(W3MAX)	W9JTX	960	
W3QPJ	2081		W3OPJ	400	
W7IIHH	1440		W3CDQ	320	
W4LKM	1402	(W4CWV)	W1SRQ	301	
W1MCW	1352		W3NHI	150	
W5RZJ	800		W4UTO	120	
W1QON	701		W1OAK	41	
W3PVH	420		W3MSU	20	
W2PVS	300		W1QJX	10	
W4UTO	200	(W4OMW)	W7KCU	10	
W6CEE	160				
W2OWL	90				
W3MSU	10				
W3CDQ	10				

YLRL

Continuing on the above subject, just a reminder—if you haven't paid your YLRL dues for 1952, limber up that billfold right away. Dues are payable on January 1st of each year, but since individual notices aren't sent out, we are apt to forget.

**Address all correspondence to 959C-24th St., Los Alamos, New Mexico*

QRU?

We're always looking for material of interest to and about YLs. Do you have any news of your own activities, know any especially interesting YL personalities, or have any thoughts or suggestions you'd like to pass on to other YLs? We'd be most happy to hear from any or all of you.

W3CDQ, NCS for the eastern 40 CW net is changing the net to Monday nights, 10:00 p.m. EST, 7075 kc.

YLs Play Santa

Our thanks to "ex-swabbie and future ham" Les Cromwell and to W6WSV for clippings from the *Los Angeles Times* containing an FB writeup and photos of the Los Angeles YL Club's venture in helping GIs in Japan play Santa Claus to the fifty boys in the orphanage near Yokosuka. All went off as planned—Santa landed via a borrowed helicopter and the servicemen soon had the boys playing baseball with the

Iris Colvin operating J2AHI. While she and her OM, Lloyd, JA2KG, were in Japan they worked 163 countries. Now they jointly operate W4KE from Fort Bragg, N. C.

bats, balls and mitts included as part of the 78 gifts the YLs had sent. All the proceedings were described to the YLs from a portable rig set up on the grounds of the orphanage. Payoff was that the fellows forgot to bring along antenna wire. They took a ball of twine, soaked it in salt water, strung it up, and put an S7 signal into W6UHA on 20 phone! The Voice of America recorded the proceedings from Maxine's QTH and broadcast them to the rest of the world.

From Carol we hear that Maxine's picture also appeared in *Rafu Shimpo*, one of the biggest Japanese language dailies in L.A., together with a write-up. Only other picture on the page was that of General Eisenhower, so W6UHA was sharing some illustrious company!

Despite the deluge of rain 18 YLs turned out for the January meeting of the L.A. club, including W6YXI and WN6MWU from San Diego who literally

poured themselves into the meeting. Guest of honor was W6SAI, Bill Orr, who treated the girls to a showing of his beautiful color pictures taken on his trip to Andorra.

Hear Ye!

The YL Radio Club of Los Angeles wishes to announce the LAD 'N LASSIE certificate, which is offered to any ham of either sex who can show proof of contact with twenty individual members of the club. Any band may be used and all contacts must be dated January 1, 1952, or later to count. When you have 20 confirmations send them to the club secretary, Mary Klein, W6AVF, 502 N. Gladys Ave., Monterey Park, Calif. The gals may be found on any and all bands, but most operate 10 and 20, both CW and phone. The calls of club members to listen for are: W6AVF, CEE, WN6CQV, W6EHA, GAI, JMC, JMS, KER, KYZ, LBO, LNP, NAZ, NLM, NZP, PJU, TDL, UHA, VWR, WQK, WRT, WSV, YZU, VE3QL/6. From time to time this list will be supplemented as new members are added and receive their calls.

XYL Does the Hamming

It happens quite often, but we always get a kick out of finding a household in which the ZYL, instead of the OM, is the licensed ham. Such is the setup at W6HVJ, Margaret Venable, who says that while her OM watches murder mysteries on TV, *she* sneaks into the bedroom and cranks up the rig. Not only that, but W6HVJ is strictly a c.w. operator, too, with 40 meters being the favored band. It all started when Margaret was talking to W6HHG one day and he mentioned working another ham in Denmark. She asked if she, too, could become a ham, whereupon he started teaching her the code. W6DTY and W6ZKL pounded the technical end of it into her head, says Margaret, and her rig is one W6DTY built. It is v.f.o. with an 807 in the final and runs about 50 watts. She uses a BC-312M receiver and a folded dipole. She's working hard on WAS but hasn't much time for operating with this kind of a schedule—40-hour week for the Navy as secretary to W6EOX, managing all of her household duties, raising two harmonics ages 8 and 9, plus keeping her non-ham husband happy!

Tribute from an OM

Seems this column is getting to be as much for the OMs as the YLs! But we like it that way and appreciate your interest. W6BGU, a long time reader of CQ and ham for many years, writes: "Do enjoy your 'YL's Frequency' so much and certainly take an interest in the wonderful work the girls are doing on the air.

"One YL I have in mind is W7IBH, Hazel Fern Cook of Missoula, Montana, and believe she is due for an honorable mention in your YL column as she is a wonderful person. Her OM, W7GCN, Albert, who now is a Silent Key, taught her the theory of radio and the code. Now she has carried on for him for all of ten or twelve years or more.

"Hazel manages a very modern motel service in Montana called the Gateway, located at the foot of Mt. Jumbo in the beautiful Rocky Mountain area. She also is a very accomplished musician; plays the piano and also plays the organ at one of Missoula's most beautiful churches.

"W7IBH consists of a Utah transmitter, about 70 watts output, on the 40-meter band. The receiver is an RCA. This setup is the exact equipment her OM operated, and I think she does wonderfully in caring for it and keeping it in constant operation. She enjoys working most everyone on the air, including hams in her home city of North Platte, Nebraska. Also wish to mention I do believe she holds a record for one continuous sked, contacting me here in California going on twelve years.

"Noticed in one issue you were seeking YL information so would be very much pleased to surprise W7IBH, Hazel Fern Cook, a wonderful person and a loyal amateur."

Indeed she must be, Jim. Our thanks to you, and we'll be happy to hear of "candidates" for this column from more of you OMs, as well as YLs.

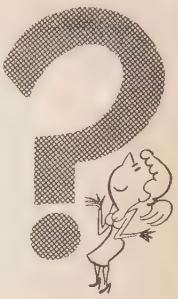
YL Of The Month

We've seen lots of claims on QSL cards, but how many can equal this one—"QSO'ed half the hams in the world?" That's what the card of W4KE carries, says W5CA, who's among the lucky half.

W4KE is jointly owned and operated by Iris Colvin and her OM, Lloyd, who is a Lt. Colonel in the U. S. Army Signal Corps. Altogether they have held fourteen different calls, and because of his military career they have lived and operated in DX spots.

(Continued on page 60)

DO YOU QSL ?



Or are you one of those who like to receive better than to give? A QSL, in our opinion, is a Statute of Ham Radio. It stands for a contact you have made with a new or old friend, who may live near or far. A QSL may represent a contact that you may make just once and never make again because of death, sickness or just QRM and band conditions. Some may have their QSLs on a wall of their shack, while others prefer to keep them in files, or in a scrap book. It is something to look at in the years to come, as perhaps a remembrance of some message you have handled to make a few hearts beat nearer to each other, or a contact you have spent many hours at trying to make points, or a QSO perhaps in the wee hours of the morn when you could not sleep. QSLs represent a hobby that gives young and old, all races and creeds, many hours of enjoyment. A hobby that is not just for the able bodied, but the blind and crippled as well. Remember the new hams just getting on the air for the first time are as pleased to receive those cards now as you were. A promise that you will have one in the next mail just to receive one yourself is a flaw in your character.

Let's all try to live up to the proverb, "Do unto others as you would have them do unto you."

W8HWX & W8HUX

"Do you QSL?" was sent to us by W8HWX, Lillian Richards, and W8HUX, Marvel Sines, who wrote it for "Ham Shack Gossip," news-sheet of the Toledo, Ohio radio club, and of which they have been editors for the past two years. Both YLs received their ham tickets on October 1, 1951. Though we publish "QSL?" here in the YLs column, let's hope the OMs pay heed to it also!

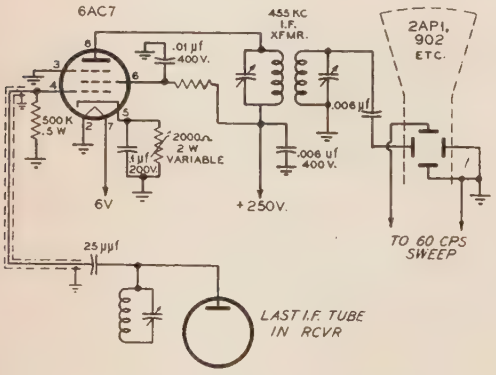
Inside the SHACK AND WORKSHOP

Your S & W Editor still needs more good ideas for this column. Don't let your nifty stunts go to waste. Rough sketches of circuits are satisfactory, and if you have photos of the idea—send them along. Each idea is worth $2.50 in cash–or a year's subscription to CQ. All S & W contributions should be addressed to Shack & Workshop Editor, c/o CQ Magazine, 67 West 44th Street, New York 18, N. Y.

Modulation Check at the Receiver

This very simple circuit may be connected to any oscilloscope to accurately check the other fellows modulation. If you do not have a scope it may be connected up using a small cathode ray tube and power supply. Most of the voltages, excepting the accelerating voltage, can be obtained from the receiver. It works very well on any receiver and enables me to see the modulation envelope exactly as observed if the scope were monitoring at the transmitter.

After it is installed the only thing that may need adjustment will be the plate tuning of the last i.f. transformer. I have attached the scope heater. plate

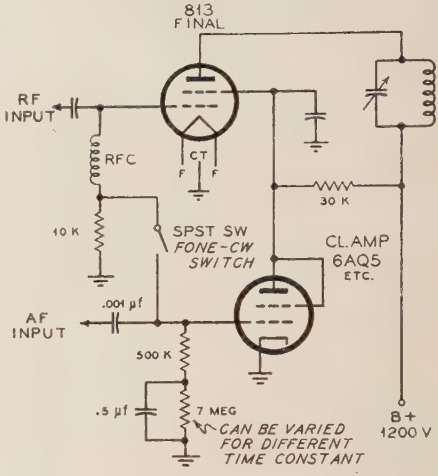


supply and i.f. lead through a socket so that when the scope is not in use, the socket may be used with a Q5-er.

Jeff Wisnia, W6KAH

Improving The Clamp Tube Modulator

Here are two suggestions for making your clamp tube modulator earn its salt in your rig. In the usual clamp tube set-up, the plate current in the final will swing from a fairly low value to quite a high value. This change in transmitted power generally makes the S meter on the receiving end swing up a couple of S units and causes a peculiar thump at the beginning of each sentence or after each pause. By the simple addition of a condenser and resistor to the clamp tube these disadvantages are largely overcome.

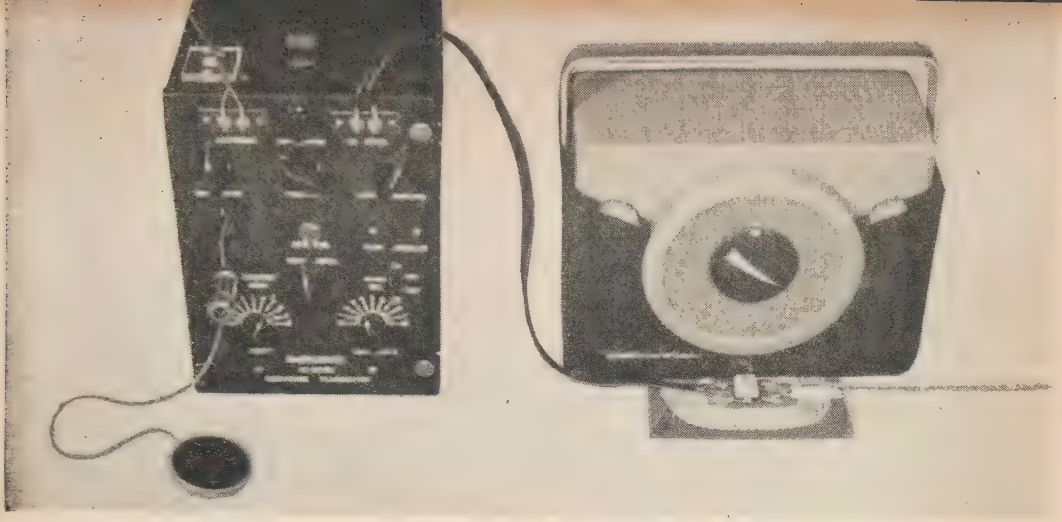


The cathode of the clamp tube is grounded and between the normal grid leak and ground a 0.5 µf condenser and 7 megohm resistor are added. When speech is applied, the condenser is charged and the only way for the condenser to discharge is through the resistor, which means a delay. This keeps the carrier level at a higher than normal value. The S meter on the receiving end hardly varies and the action of the AVC is smooth keeping down the thumps.

In my 813 final, the plate current with no modulation is about 80 mils. When modulation is first applied, the current swings rapidly to a value of about 130 mils . . . then as the speech is continued, the plate meter hardly moves from the 130 mil value. Even at the end of a sentence the decay time of the RC net is such that the current won't have time to fall back to its original value. Admittedly, there is a swing and slight thump at the beginning of each transmission (not sentence), but it occurs so fast that it is not objectional. The receiving operator will have a difficult time telling it from regular plate modulation.

The second addition to the clamp tube is a SPST switch from the grid of the clamp tube to the grid of the final (below the RFC). When the switch is closed the final bias cuts off the clamp tube in the conventional fashion, permitting an earlier stage to be keyed with no protective bias on the final. With the switch open the clamp tube functions as the modulator. I haven't even found it necessary to shield this switch lead, even though it's quite a long run from clamp tube to switch and back to the final. I believe these two simple additions to your clamp tube will be worth while.

Lynn Stadham, W4HZT



The complete emergency station featuring a self-contained transmitter and a 28-mc converter. The converter is loop coupled to any battery BC receiver. The microphone is an F-1 cartridge with leads soldered directly to the contact rings.

Emergency Converter-Transmitter for 10 Meters

HARTLAND B. SMITH, W8VVD*

This is one of those ideas when the expression comes to mind, "Why didn't I think of that?" The portability and labor saving features of this transmitter-converter combination make it rank high in rounding out your CD equipment —Editor.

If it is to function effectively, a Civil Defense communications network should have an assortment of equipment types available at all times. Most emergency setups have self-powered fixed stations and plenty of mobiles. In addition, some of these organizations possess walkie-talkies and portable stations powered from automobile batteries.

A walkie-talkie can be very useful for handling traffic from a point inaccessible to a mobile unit[1]. If the distance to be covered doesn't exceed a half mile or so, a walkie-talkie will do an excellent job. However, these little units have several drawbacks with regard to sustained communication. In order to be light enough so that it can be worn or carried comfortably, the walkie-talkie's battery capacity must be limited. Transmission range is restricted because antenna length must be kept to a minimum if the unit is not to become unwieldy. Such drawbacks can be overcome in a portable rig designed to work from an automobile battery. However, a device can only be as portable as its power source. When a storage battery is relied on, either an automobile must be close at hand, or else a battery has to be removed from a car and carried to the point of operation.

After you've lugged an auto battery over rough ground for a mile or two it will take little argument to convince you that something midway between the heavy weight storage battery portable and the light weight walkie-talkie should also be available to the well organized emergency network. The device to be described meets this requirement. When used with a battery portable radio it forms a complete, self contained station. It is light enough to be carried without undue fatigue to any point

[1]P. S. Rand, W1DBM, "The CD 28 MC Walkie-Talkie," CQ, p. 21, Nov., 1951.

*467 Park Avenue, Birmingham, Mich.

needing communication, and yet its batteries have reasonably long life. The range of the transmitter with a haphazardly strung antenna is several miles. When it is connected to a good aerial, it can be used as a temporary control station that will easily furnish solid signals to mobiles within a range of five miles.

The Converter

When considering the design of the receiving portion of the unit, it seemed at first that nothing less than a superhet would be satisfactory. However, the construction of a complete receiver of this type was felt to be impractical. Therefore, it was decided to build a converter which could then be used ahead of any ordinary battery portable receiver that might be on hand.

For simplicity's sake, a single tube circuit employing a 1R5 was first tried, but at 28 mc results were disappointing due to excessive oscillator pulling. Through the utilization of separate oscillator and mixer tubes, the pulling effect can be held to a practical minimum. The 1R5 oscillator, 1U4 mixer combination produces a converter with excellent sensitivity. When working into an average battery portable, the performance closely approaches that of ham receivers selling in the $100 bracket.

Converter/Receiver Coupling

Most battery portable receivers have either a loop or one of the new ferrite rod antennas. In many instances, no provision is included for attaching an external aerial. Even if a connection is available, it is usually inefficient and offers little signal transfer. To overcome this difficulty, the converter employs a loop antenna as the mixer plate coil. This loop, when brought near the loop or ferrite rod of a portable receiver, does a very good job of coupling the converter's output into the set[2].

There is a possibility that this unusual method of coupling may be subject to leakage interference from stations operating on the converter's i.f. Since any frequency between 1500 kc and 1700 kc may be utilized, little difficulty should be experienced in finding an unoccupied spot in the spectrum. If the companion receiver will not tune above 1600 kc, it is advisable to realign the set so that its top frequency is at least 1650 kc. This will not materially affect the dial calibration, but it will give plenty of high end tuning space in which to find a vacant i.f. channel.

Another unusual feature of the converter is that shunt feed is used in the mixer plate circuit. Under certain conditions, 90 volts, even from a small B- battery can give you a nasty jolt. Therefore, shunt feed was included in order to keep d.c. off the loop and its exposed leads.

The tuning range of the converter is held to little more than that necessary to cover the frequencies from 28.5 mc to 29.7 mc. This restricted range spreads the band sufficiently to make a vernier dial drive unnecessary, thus saving both space and cost. The loss of the DX band from 28 mc to 28.5 mc is of little consequence.

COIL SPECIFICATIONS

L1—22 T No. 26 wire spaced diameter of wire on 1/2 inch form
L2—9 T No. 14 wire closewound, 5/8" inside diam.
L3—Same as L2
L4—AC-DC filter choke
L5—6 T
L6—12 T 1/8" from L5 on same form
L7—5 T
L8—7 T 1/8" from L7 on same form
Loop—4" x 5 1/2" JFD No. 21-10

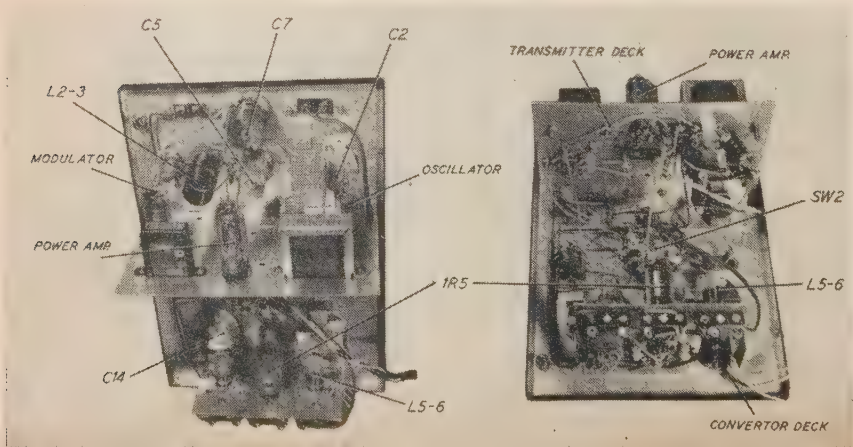
SPECIAL DATA ON COILS

L5, L6, L7 and L8 are wound on 1/2" polystyrene forms with No. 26 enamel wire spaced the diameter of the wire.

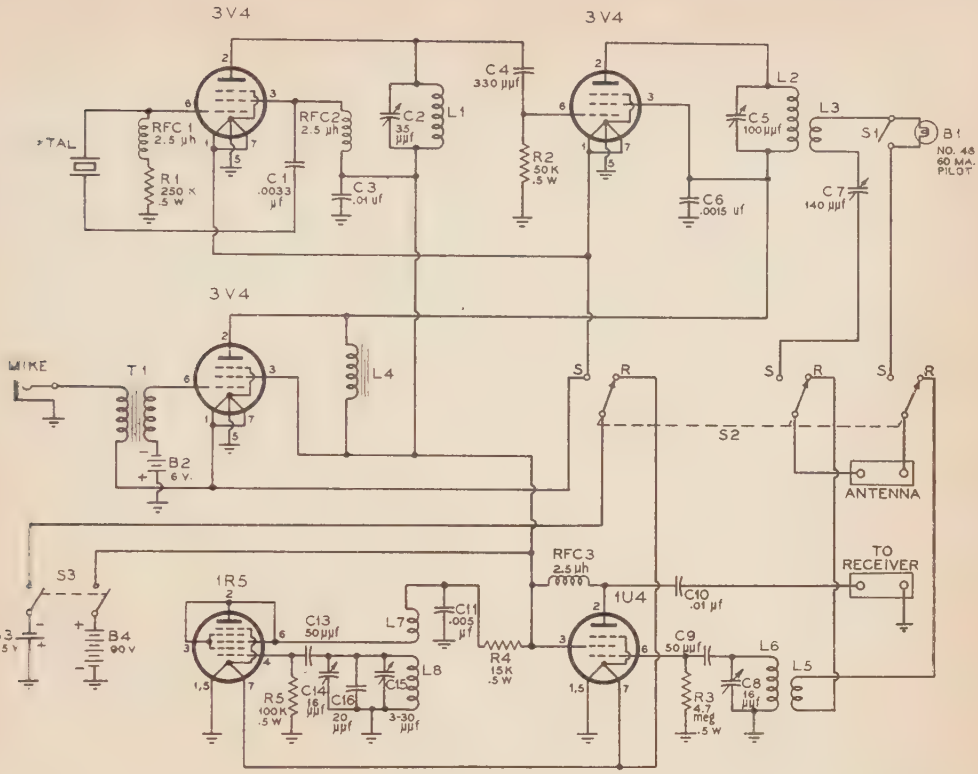
The converter is built on its own little chassis with parts mounted as shown in the lower portions of *Figs. 1* and *2*. Wiring is fairly simple and all one need remember is that it pays to keep r.f. leads short. The wire which runs from *C10* to the output loop connector should be kept well away from the chassis, panel and other leads so that its capacity to ground will be as low as possible.

The oscillator injection condenser, *C12*, is made by soldering a piece of insulated hookup wire to pin 6 of the 1U4. The free end of the wire is then

2 What would normally be the antenna winding on the converter's output loop can be used as a link to couple the converter to receivers designed for use with a conventional antenna and ground.



Figs. 1-2. Because of the simplicity of the wiring no great pains were taken to make the unit "ultra" compact. Two decks have been used, the upper one for the transmitter and modulator, the lower one for the converter.



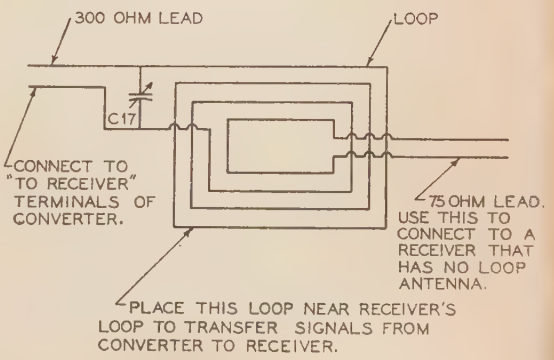
Wiring Schematic

B1—No. 48, 60 ma pilot bulb
B2—6 v C-battery (4 penlite cells in series)
B3—1.5 v A-battery (4 size D cells in parallel)
B4—90 v B-battery (2 Eveready 482 or RCA VSO13)
C1—.0033 μf mica
C2—35 μμf air padding condenser
C3, C10—.01 μf disc ceramic condenser
C4—330 μμf mica
C5—100 μμf air padding condenser
C6—.0015 disc ceramic
C7—140 μμf air padding condenser
C8—3 plate 16 μμf midget variable
C9, C13 50 μμf ceramic
C11—.005 disc ceramic
C12—(see text)
C14—3 plate 16 μμf midget variable with one stator plate removed
C15, C17—3-30 μμf mica trimmer
C16—20 μμf ceramic
R1—250,000 ohms, 1/2 w
R2—50,000 ohms, 1/2 w
R3—4.7 meg., 1/2 w
R4—15,000 ohms, 1/2 w
R5—100,000 ohms, 1/2 w
RFC1, RFC2, RFC3—2.5 mh. r-f choke
S1—SPST slide switch
S2—DPST slide switch
S3—3 pole 2 position ceramic bandswitch
T1—Midget single button mike to grid transformer

wound for a turn or two around the pigtail of *C13*, the oscillator grid blocking condenser. The exact number of turns must be determined by experiment, since too many will cause *C8*, the mixer tuning condenser, to pull the oscillator frequency, while too few will give inadequate oscillator injection.

Tuning Up The Converter

To test the converter, first attach the antenna. Adjust trimmer *C15* so that the tuning range of the oscillator runs from about 26.6 mc to 28.4 mc. The output loop should be placed near the receiver's loop and the receiver should be tuned to a clear spot on the high frequency end of the broadcast band. Loop trimmer *C17* can then be adjusted for maximum background noise in the receiver speaker. Since most loops sold for replacement purposes have a little more inductance than usually required, it may be necessary to remove 5 or 10 turns from



Details of the loop wiring.

the converter loop to obtain resonance at the desired frequency.

The mixer grid condenser *C8* needs only to be peaked once or twice as the oscillator is tuned across the band. Since it is possible to adjust the mixer control to an image, the proper midband position of the mixer condenser should be identified by a distinguishing mark on the panel.

Transmitter Design

Cost, circuit simplicity and battery economy were all given due consideration in the choice of a transmitter circuit. Seven mc was decided upon for the oscillator frequency because crystals in this band are inexpensive and plentiful. In an emergency, if it should become necessary to steal a crystal from another ten meter rig, a 40 meter rock would probably be the most likely one available.

Quadrupling oscillators are tricky, and so the rig uses a modified Pierce circuit which doubles to 20 in its plate circuit. Two methods for getting ten meter output presented themselves. Another doubler could have been used and the final worked straight through or the final, itself, could double. The latter plan was chosen, because the power output gained by straight through operation did not offset the added plate and filament drain occasioned by an intermediate doubler. An added dividend of final doubling is that no neutralizatic is required.

All three transmitting tubes are 3V4's. The 3V is more easily driven than either a 1S4 or a 3S and it sells for less than a 3Q4. Of the popula miniature power pentodes, the 3V4 seemed th most logical choice not only for the oscillator, bu also for the final and modulator.

Adequate modulation is provided by the singl class A modulator tube. When heard at a distance the carrier appears well filled and a check on a oscilloscope confirms that the transmitter can b modulated at a high percentage. Bias for the modu lator stage is somewhat higher than the recom mended 4.5 volts. However, the use of an extra volt and a half reduces the static plate curren a bit more without materially affecting the dis tortion produced in this stage.

Although a surplus T-17 mike can be used, bette frequency response and more audio will be obtained from a telephone type Western Electric F-1 mike The F-1 gives high output and imparts a natural ness which raises the sound quality of the rig above the fuzzy, muffled standard achieved by sc many mobiles and portables.

The number of turns employed in output coil *L3* may seem rather large. However, this particular coil, plus condenser *C7* makes it possible to feed power into any antenna rod from 1 to 8 feet in length or into loads ranging from 75 to 300 ohms.

In the interest of economy and compactness, the transmitter employs no meters. The sole tuning indicator is a #48, 2 volt, 60 ma pilot bulb which may be thrown in series with the antenna lead through the tune-operate switch *S1*.

The front panel is completely marked in case the unit is placed in the hands of an inexperienced operator.

Tuning Up

During preliminary tests, the transmitter can be tuned with the aid of a communication receiver, preferably one which boasts an S-meter. The receiver should first be tuned to the second harmonic of the crystal. Oscillator condenser *C2* may then be adjusted for maximum S-meter deflection. The receiver should then be tuned to the ten meter harmonic and amplifier condenser *C5* rotated for maximum S-meter reading. (The final plate condenser *C5* need only be 35 to 50 $\mu\mu$f. 100 $\mu\mu$f was used because it happened to be the only value left in the junk box.)

A dipole can then be connected to the antenna terminals via 75-ohm twinlead and the *tune-operate* switch put in the *tune* position. The antenna coupling control which varies the position of *L3* and the tuning condenser, *C7*, should each be adjusted for maximum brilliance of the antenna current indicator. Slight readjustment of the amplifier condenser, *C5*, may also be required.

The preliminary tune-up should be made on a frequency near the middle of the band. Once the proper settings for the oscillator, amplifier and coupling controls have been found, the knob positions can be permanently marked on the panel. When it becomes necessary to tune up in the field,

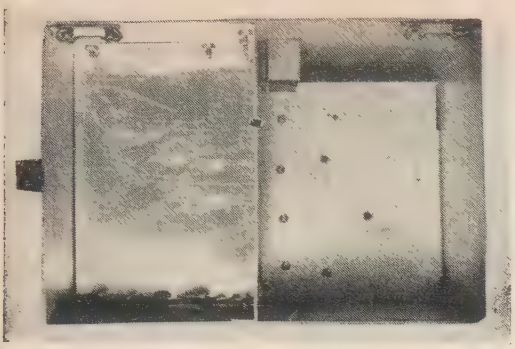


Fig. 3. Looking into the back of the modified interior of the CW-1/ARR-1 cabinet. The partition has been sawed in two leaving a five inch piece coming up from the bottom. It is held in place by a self tapping screw on the left and a screw and bushing on the right. The four bolts are the "negative" contacts for the A-battery. A 6⅜" x 7⅛" piece of aluminum has been bent to fit into the cabinet to form storage space.

the controls can be set to the marked positions and only a slight touching up will then be required, even at the band extremes. Without guide marks, correct tuning is almost impossible, but with them it's a cinch. The antenna tuning condenser *C7*, need not be marked because its position changes considerably with different antennas.

When the batteries are fresh, the antenna current indicator will glow quite brightly. However, as the batteries age, the bulb may become rather dim. Should this happen, whistling in the mike will usually brighten the bulb enough to make the tuning process easier. If there is no glow at all, short the antenna connector. This will put the bulb directly across the transmitter's output and will give a positive indication, provided the batteries have any life at all. Removing the short will detune the antenna circuit to some extent, but there should still be sufficient output for most purposes.

Construction

Although a blank steel transceiver case could have been used to house the converter-transmitter, a CW-1/ARR-1 test oscillator proved remarkably well suited for the purpose. This particular surplus item, containing a gold plated cavity resonator, two 955's plus several other parts has been selling for around $2.00 and is still available from some dealers[3]. The CW-1/ARR-1 is especially handy for the foundation of the converter-transmitter because it includes battery plugs and has a partition just the right size to fit the B-batteries. After removing the original components from the case, the battery compartment partition was sawed horizontally 5 inches from the bottom. The top half of the partition was then removed. A piece of aluminum was cut and bent to shape so that it could be fastened into the case as shown in *Fig. 3*. The added piece not only divides the case into three sections, but also helps to hold the A-batteries in place. The front half of the case contains the transmitter and converter, while the bottom half of the back portion becomes the battery compartment. Above this there is space for storing the output loop, a dipole with feedline, microphone, spare parts, etc.

After the transmitter and the converter were constructed on their separate chassis, they were fastened to the front panel. The terminals and switches were then wired and the B-battery plugs attached.

At first glance, the front panel may appear a bit wordy. However, the controls should be marked for easy identification by those unfamiliar with the equipment. As a further aid to the individual using the device for the first time, a circuit diagram and operating instructions should be pasted inside the back cover.

As one would expect, the performance of the converter-transmitter is dependent upon the voltages supplied by both the A- and B-batteries. Little change in the operation of the transmitter can be noted until the filament voltage drops below 1.2. When the 1.1 volt level is reached, the output begins to fall off and the rig downward modulates. B-voltage is a little less critical, with a lowered but useful output at 60 volts.

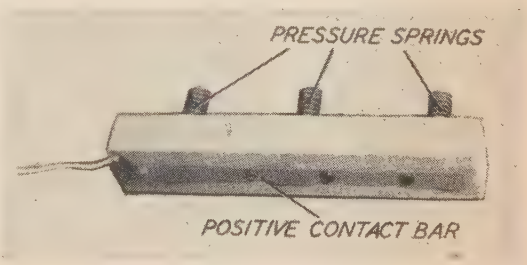


Fig. 4. Wedge for the A-batteries. The springs push the wood block against the batteries when the back cover is in place. The copper strip contacts the positive terminals of the batteries.

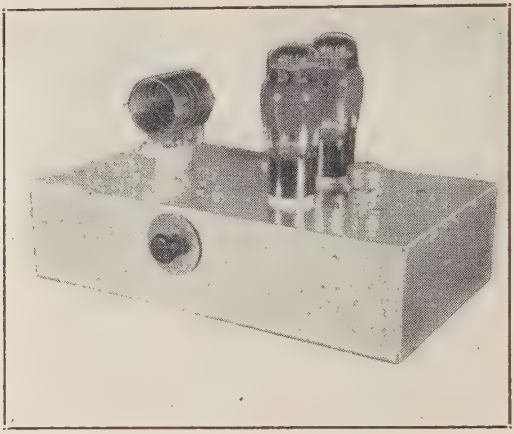
The converter shows only a slight change in sensitivity, even with a filament voltage of 1 volt and a plate voltage of 50. The converter B-drain is between 3½ ma and 4 ma while the transmitter draws about 28 ma when fully loaded. Unless you do more talking than listening, battery life should be reasonably good.

An easy way to install the flashlite cell A-batteries is to solder four of them in parallel and then jam them into the case. Such an arrangement is o.k. except when the batteries need to be replaced and no soldering iron is available. To obviate a frustrating occurrence of this nature, the cells are held in place as shown in *Fig. 4*. The positive connector for the cells is made from a piece of wood

(Continued on page 67)

[3]Radio Wire Television, Inc., 100 6th Ave., N. Y. 13. Stock No. P21114, $1.95, plus postage.

The Old One-Two



MAJOR R. H. MITCHELL, W6TZB*

Like the motorist with the new car—the second question voiced by many novice licensees is "How can I run the legal limit?" The answer, as this article shows, can be quite simple. 75 watts input with this rig is as simple as the proverbial "rolling off a log" —Editor.

Would you like to get your wife interested in ham radio? It's easy — just take a trip to Africa. Some time ago, the writer did just that. With the cooperation of W4KWY, my wife was able to talk to CN8ER — the Moroccan branch of W4RQR—on 14 mc phone. As a result, the first overwhelming news I received upon my return to the States was that she had decided to get an amateur license. After the initial shock, I gathered that she was going on 14 mc phone with a kilowatt, so that she could talk to me any time she desired. After we reviewed the regulations, she compromised on getting a novice class license and gaining some experience before going on to broader horizons.

The novice license permits c.w. operation in the 80 and 11 meter ham bands, using a crystal controlled rig with a maximum input of 75 watts. We decided upon 80 meter c.w. operation for several reasons. First, a simple rig was possible; next, during the current sunspot period, 11 meter operation will not afford consistent communication beyond ground wave range. Then, too, 80 meter operation is far more effective at night. Since the regulations permit 75 watts, we decided to use a power level close to the maximum.

Quarters AU, MCAS, El Toro, Calif.

A survey of current material on novice rigs revealed that most are in the 10 to 20 watt class. This consideration caused us to do a little "original research" into circuitry. Our back files of radio magazines produced two versions of a rig that looked as though it would fill the specifications set forth above.[1,2] This transmitter used a pair of 6L6G tubes in a push-pull crystal oscillator circuit. The title now becomes self-evident. An ancient circuit, one variable condenser, two tubes —hence, "The Old One-Two."

Our requirement of simplicity was met—the unit uses only one tuning control, and is a single stage job, eliminating neutralization and interstage adjustments. The power level of 75 watts is easily attainable. In fact, Sutter[2] ran his "QSL Push-Pull" at around 180 watts. Our 480 volt power supply would give 75 watts easily. And, we had a good reserve plate emission.

These features seemed attractive to us, and they may be even more attractive to the beginning amateur. Our version of this little rig is shown in *Fig. 1.* Several changes were made in the previous models. These provide for easier construction and reduce TVI. The simplicity of the transmitter is evident in the photographs.[3]

While a smaller chassis could have been used, it was felt that a standard 7x12x3 inch chassis

1 "The Simplest 50 Watt Transmitter," Radio, Dec. '36

2 "The QSL Push-Pull," Sutter, QST, June '40

3 Also evident in the photographs is a 40 meter plate coil. We had a commercial coil for this band, and it was much prettier when we took the photographs than our home-brewed 80 meter coil. The transmitter works well on both hands, so there is no chicanery involved.

would readily lend itself to novice construction. Few tools are necessary for this job. The unit was built on our operating table, using only hand tools and a socket punch.

Wiring

The easiest way to start the transmitter is by punching the socket holes, then mounting the sockets. Next, mount the crystal socket, the variable condenser (*C8*), the terminal board, and the coaxial output connector (*J1*). Now, the wiring may be commenced. The three by-pass condensers on each socket (*C2, C3, C4* and *C5, C6, C7*) are connected directly to *pin 2* of their respective socket. *Pin 2* is then connected to ground on the terminal strip (*Terminal 1*). Join the cathode connections (*pin 8*) and run the common lead to the cathode resistor (*R1*). The other end of the cathode resistor is bypassed directly at the resistor through *C10*, and the resistor is connected to *terminal 4* on the terminal strip.

Now, connect the crystal socket and grid leads. We used stand-off type r-f chokes, but they are not necessary. Join the "cold" end of the r-f chokes and connect them to ground through as short a lead as possible. Since most of our crystals had ¾" spaced pins, we used a crystal socket of this spacing. Inasmuch as the smaller crystal holders are now popular, it is suggested that a socket for these holders would be preferable to the socket illustrated.

The next step consists of joining *pin 7* from one socket to the other. This is the hot filament lead, and v.h.f. isolation is provided by v.h.f. choke (*RFC3*) and 50 $\mu\mu$f mica bypass condenser (*C1*). The choke is visible at the rear of the chassis, and the condenser is just under the rear terminal of *R1*. The choke shown is a surplus item. Actually, any v.h.f. choke capable of carrying the 1.8 ampere filament current may be used. Don't omit this choke and condenser. They will give you a healthy reduction in TVI. Now, connect the junction of the choke and condenser to *terminal 3*. This is a good time to connect *terminal 1* on the terminal block to ground. Put a soldering lug under one of the nuts used to hold the terminal block, and run a wire from that lug directly to *terminal 1*. Incidentally, grounding components directly to the nearest point on the chassis, as well as the use of soldering lugs under a screw or nut, may meet with some raised eyebrows. However, such a ground has a lower d.c. resistance than has the usual ground lead soldered to the chassis, particularly when an inadequately heated soldering iron is employed. The r-f resistance of a large chassis is bound to be less than that of an equivalent length of 14 gauge wire, and, if lock washers are used, the ground will outlast the rig.

The only remaining wiring is that in the screen and plate circuits. The screen bypass condensers (*C4, C7*) have already been mounted, so join the two screen connections, and run a shielded wire from this lead to *terminal 6* on the terminal block. Ground the shield of this wire at each end.

We made use of a surplus standoff r-f choke (*RFC4*) in the plate circuit. It isn't necessary to duplicate this choke, but any substitute should be rated at 300 milliamperes or more, and must have an inductance of at least one millihenry. The ground side of *C9*, the shield for the high voltage lead, and the ground side of the antenna coupling coil are connected to the chassis under the "feet" of this choke. Connect *pin 3* on the coil socket to one side of the r-f choke (*RFC4*), and connect the other side of the choke to *C9* and to the inner conductor of the shielded high voltage lead. Run the other end of this lead to *terminal 8* on the terminal block, and ground the shield on that end.

Now, run a wire from *pin 5* of the coil socket to the coaxial connector. Then join one stator of *C8* to *pin 2* and one to *pin* 4 of the coil socket. Connect the rotor of *C8* to ground with as short a lead as possible. Finally, run a lead from one stator to *pin 3* on one 6L6G socket, and a lead from the other stator to *pin 3* on the other 6L6G socket. The wiring is now complete.

It may be desirable to substitute a different condenser for *C8*. In our rig, this is another

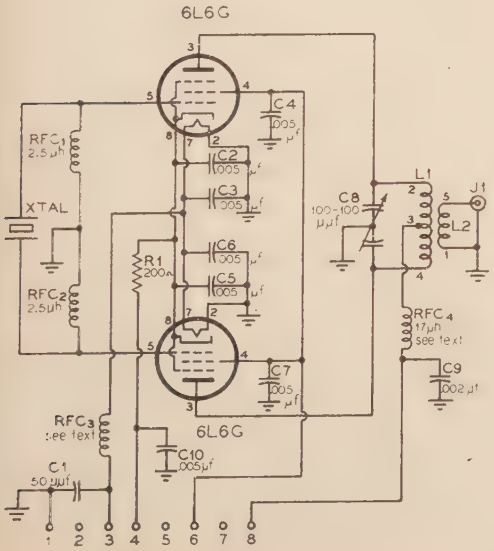


Fig. 1. Wiring schematic.

C1—50 $\mu\mu$f mica.
C2, C7, C10—.005 μf disc. ceramic.
C8—100 $\mu\mu$f / section .030" spacing. (See text).
C9—.002 μf 1000 v.d.c. mica.
J1—Coaxial jack.
L1, L2—75 w center link coil for band in use.
R1—200 ohms, 10 w.
RFC1, RFC2—2.5 mh r-f choke.
RFC3—36 T #18 enam. wire wound in 3 layers on ⅜" diam. bakelite core. (See text).
RFC4—17 mh 300 ma r-f choke. (See text).

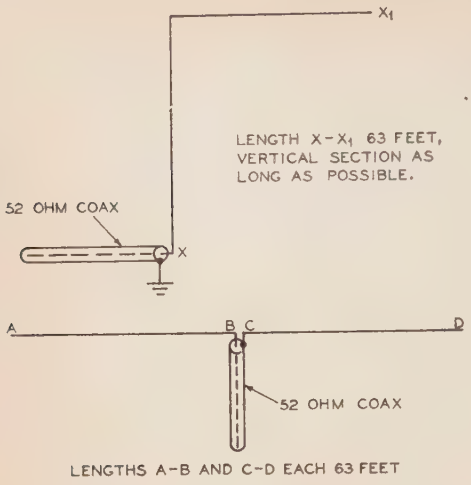


Fig. 2. Two suitable antennas both being fed with 52 ohm RG-8/U cable.

surplus item. A 200, $\mu\mu$f per section condenser with .030 inch spacing would be preferable, in all probability. We couldn't find a commercial 80 meter coil to use in this rig, and it's possible that this condenser doesn't have enough capacity to resonate such coils to 80 meters.

Tuning Up

Plug a crystal, two 6L6G tubes and a coil in their respective sockets, connect a 6.3 volt 1.8 ampere supply to *terminals 1* and *3*, connect the B negative lead to *terminal 1*, run 330 volts positive to *terminal 6*, and run 400 to 500 volts positive to *terminal 8*. We obtained our screen voltage from a voltage divider type arrangement. A 5000 ohm 25 watt resistor was connected between B plus and the screen lead, while a 25000 ohm 25 watt resistor was connected from the screen lead to ground[4]. Connect a key to *terminals 1* and *4*, and the rig is ready to fire up. A meter capable of reading at least 250 milliamperes should be connected in series with the B plus lead to facilitate tuning.

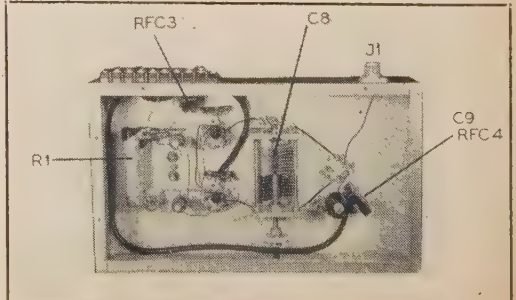
Start with the tuning condenser at minimum capacity, and rotate it until a plate current rise and then a dip is noted. The plate current should be about 100 milliamperes at minimum capacity of *C8*, increasing to 200 or 220 milliamperes as resonance is approached, then decreasing to 20 to 40 milliamperes at resonance, dependent upon crystal activity. As the condenser is rotated past this resonant point, the current will abruptly increase to 100 milliamperes, indicating that oscillation has ceased. Retune the condenser to minimum plate current, and tune a receiver to the signal. Now, check the keying. The transmitter may not key well at exact plate current minimum. If this happens, set the condenser just slightly on the low capacity side of the minimum current setting. The plate current will be about 10 or 20 percent higher than the minimum value for best keying with sluggish crystals. The keying should be good and the note in the receiver should be clear.

After these checks, it's time to tie an antenna onto the rig. We used a coaxial terminal because we prefer coaxial fed antennas. If a different antenna is to be used, another type of output connector may be desirable. Two suitable antennas are shown in *Fig. 2*. Neither of these should require tuning or pruning to work with this rig. If available, a coil with a variable center link should be used. Set the coupling at minimum (link all the way out) and rotate the tuning condenser until a plate current dip is obtained. With minimum coupling, this dip probably will be lower than desired. If so, increase the coupling in small steps until a plate current of 140 to 160 milliamperes is attained. Of course, each time the antenna coupling is changed, the variable condenser must be returned for minimum plate current. When the variable condenser is tuned for absolute minimum plate current, with this amount of loading, the transmitter will not key cleanly. It will be again necessary to tune the condenser slightly on the low capacity side of resonance to get clean keying. This should be checked by listening to the signal in a receiver. We had a 480 volt power supply. Since some 30 volts are lost in the cathode resistor, this lowers the effective plate voltage to 450. That gives us 72 watts input, with a plate current of 160 milliamperes. So, in tuning, we increase coupling until we get 140 milliamperes at minimum plate current setting of *C8*. Then we tune *C8* to the low capacity side of resonance until the plate current reaches 160 milliamperes. This results in a just detectable loss of power output—detectable on a meter, not by ear.

Actual power output is good. We have a 51 ohm dummy load that is accurate beyond 40 megacycles. An r-f ammeter in the line between the dummy load and the transmitter shows somewhere around 0.92 amperes of current on both 80 and 40 meters with 70 to 75 watts input. This represents 43 watts output, which isn't bad considering that it includes

(Continued on page 68)

Looking under the chassis reveals the very few components used in this novice transmitter.



[4] Series screen feed was tried, but was not satisfactory. This system drops the screen voltage too low at resonance, when a reasonable resistor value is used, and also results in some keying chirp on 40 meters.

Ionospheric Propagation Conditions

GEORGE JACOBS, W2PAJ*

In previous issues we have discussed the iono-phere upon which all short wave transmissions de-end, and the fact that it is brought into existence y ultra violet energy radiated by the sun. Since the un is responsible for the formation of the ionosphere, e should expect many variations in the degree of onization between day and night, and also between ummer and winter. Such is the case, and March iarks the month when a definite change is expected or radio conditions.

March 21st is the occasion of the Vernal Equinox the Autumnal Equinox occurs September 23rd), iat day when the sun's center crosses the equator s it travels northward. At this time, day and night re of equal length. This solar phenomena has its elated effects on radio propagation. In the northern emisphere daytime frequencies are on the decrease, hile due to the longer hours of daylight, night-me frequencies are increasing. This means that n East-West paths ten meter openings will decrease onsiderably; however, twenty meters should remain pen considerably later than it has during the winter ionths. Forty meters should also be more stable for all dark" transmission paths.

In the southern hemisphere, the opposite is taking lace. It is the fall season now and daytime fre-uencies are increasing, night-time frequencies de-reasing.

Therefore, during the period of the Equinox March and April), there is sort of a balancing effect or northern to southern hemisphere transmission aths (and vice versa). Usable frequencies are high on many circuits, higher than at any other time of ie year), and absorption values are at their lowest, nce there is the maximum amount of darkness on iese paths. This indicates that 40 meters should be t its best for the long circuits into Australia, the ast Indies and the Far East. Also 20 meters should ee some good openings to these areas.

Domestically, the local 75 meter phone networks iat have been disrupted by drop outs during the inter at about 7 p.m. local time, can now look orward to the band holding up at least until 10:30 m. local time during normal *Propagation periods.*

The sunspot numbers continue to decrease at a ery slow rate. Propagation data for this month is based on a predicted smooth Zurich sunspot number of 52.

Basic propagation data used for determining the *Propagation Charts* has been obtained from the National Bureau of Standards Series D-88, publication entitled, "Basic Radio Propagation Conditions for March, 1952". The charts are based upon an effective radiated c.w. power of 150 watts assuming an antenna that radiates at vertical angles less than 20 degrees.

620 Bedford Ave., Brooklyn 10, N. Y.

Last Minute Ionospheric Storm Predictions

Below normal radio conditions are most likely to occur March 5-12, 27-28. March 20-22 is expected to be very erratic. Ionospheric disturbances affect to a far greater extent, transmission paths through or near the auroral zones, and may have little or no effect on other transmission paths.

General Propagation Conditions—March, 1952

The following is a brief commentary on expected propagation conditions for amateur circuits from the United States to the five major areas of the world. For times of the most probable band openings for any particular circuits refer to the *Propagation Charts.*

EUROPE: Ten meter openings will taper off almost completely. Some openings are expected for southern W4s into Southern Europe, but not much for other W areas . . . Twenty meters should improve considerably. The band should remain open as late as 0000 GMT on many days, especially after March 15 . . . DX conditions on 40 should be quite good, with the band staying open throughout the "all dark period" not dropping out as it did during the winter evenings . . . Fair to good DX conditions are expected on 80 meters, but with signal levels lower than on forty . . . For you 160 meter men, best time to try to work Europe should be between 0600-0800 GMT, sunrise at the European end of the circuit. These transmission paths favor the Eastern and Central sections of the U.S.A.

SOUTH AMERICA: DX conditions continue to be very good on these stable circuits. Ten meters is expected to open almost daily from shortly after sunrise until shortly before sunset local time . . . Twenty meters will be open almost around the clock. For night-time DX, the 40 and 80 meter bands will produce good strong openings to Central America and northern South America, with frequent openings to countries south of the equator.

AFRICA: Fairly good ten meter openings are expected to Southern and Central Africa with infrequent openings to Northern Africa . . . On twenty meters, North African stations should be heard at about the same time as the southern Europeans. The Central and South Africans start coming in during the same period, but tend to have a mid-day drop out because of the increased absorption on these longer circuits . . . Forty and eight meter openings to North Africa should be quite frequent during the all dark period. Conditions become progressively poorer as the circuits become more southernly, but more openings are expected during March on 40 and 80 to these more southern areas then during the winter months.

OCEANIA (Australia and New Zealand): Some good ten meter openings are expected for Pacific Coast QTHs, with occasional openings from the

(Continued on page 60)

MARCH 1952

EAST COAST TO: (Centered on Washington, D.C.)	10 Meters	20 Meters	40 Meters	80 Meters
	ALL TIMES IN GMT			
Scandanavia	Nil	1100-1300 (2) 1300-2000 (1-2) 2000-2200 (3)	0000-0800 (2-3)	0030-0800 (1-2)
Great Britain & Western Europe	1600-1730 (0-1)	1100-1400 (3-4) 1400-1800 (2-3) 1800-2230 (4)	0000-0700 (3-4)	0030-0600 (3)
Balkans	Nil	1030-1300 (2-3) 1300-1900 (1-2) 1900-2230 (3-4)	2330-0700 (3)	0000-0600 (2)
Southern Europe & North Africa	1600-2100 (1-2)	1000-1300 (3-4) 1300-2000 (2-3) 2000-0000 (4)	2330-0700 (3-4)	0000-0630 (3)
South Africa	1500-1930 (2-3)	1030-1900 (1-2) 1900-0100 (2-3)	0000-0300 (2)	0030-0300 (1)
Near East	1530-1700 (0-1)	1030-1800 (1-2) 1800-2100 (3)	0000-0400 (2)	0030-0330 (1)
Central America & Northern South America	1500-2200 (4-5)	1100-1600 (4-5) 1600-2300 (3-4) 2300-0200 (5) 0200-0830 (3)	0000-1130 (4-5)	0030-1100 (4)
South America	1330-2300 (4)	1000-1200 (3) 1200-2300 (2) 2300-0830 (4)	0000-0900 (3)	0030-0830 (2-3)
Hawaii	1800-0000 (1-2)	1500-0130 (2) 0130-0400 (3-4)	0400-1100 (4)	0430-1030 (3)
Oceania	2130-2330 (1-2)	1130-1500 (2-3) 1500-0130 (1) 0130-0330 (2-3)	0630-1200 (2-3)	0700-1130 (1-2)
Guam	Nil	1300-1700 (2-3) 1900-0130 (1-2) 0130-0400 (2-3)	0900-1100 (1-2)	0900-1100 (0-1)
Japan	Nil	1330-1430 (1) 2000-0100 (1-2) 0100-0300 (2-3)	0930-1100 (1-2)	0930-1100 (0-1)
India	Nil	1130-1800 (1-2) 0130-0230 (1-2)	2330-0100 (1)	Nil
Philippine Islands & East Indies	Nil	1200-1900 (2) 2100-0130 (1-2)	1100-1200 (1)	Nil
West Coast - USA	Nil	1500-2200 (2-3) 2200-0130 (4-5)	0200-0900 (4-5) 0900-1200 (2)	0200-1200 (4)

CENTRAL USA TO: (Centered on St. Louis, Mo.)	10 Meters	20 Meters	40 Meters	80 Meters
	ALL TIMES IN GMT			
Great Britain & Western Europe	Nil	1200-1430 (2-3) 1430-1900 (2) 1900-2230 (3)	0030-0500 (3) 0500-0800 (2)	0100-0600 (2-3)
Central Europe	Nil	1130-1400 (2-3) 1400-1930 (2) 1930-2200 (3)	0030-0500 (3) 0500-0900 (2)	0100-0600 (2)
Southern Europe & North Africa	1600-1900 (1)	1130-1300 (3-4) 1300-2000 (2-3) 2000-2330 (4)	0030-0600 (3)	0030-0600 (2-3)
South Africa	1500-2000 (2-3)	1100-2000 (1-2) 2000-0100 (3)	0100-0400 (2)	0100-0400 (1)

MARCH 1952

CENTRAL USA TO: (Centered on St. Louis, Mo.)	10 Meters	20 Meters	40 Meters	80 Meters
	ALL TIMES IN GMT			
Central America & Northern South America	1500-2300 (4-5)	1100-1500 (4-5) 1500-2300 (3-4) 2300-0300 (5) 0300-1100 (3)	0100-1030 (5)	0100-1030 (4-5)
South America	1400-0000 (4-5)	1100-1300 (3-4) 1300-2300 (2-3) 2300-0830 (4-5)	0200-0930 (3-4)	0200-0900 (2-3)
Hawaii	1800-0100 (2)	1500-0230 (2) 0230-0500 (4)	0400-1230 (4-5)	0430-1230 (4)
Oceania	2130-0000 (2-3)	1400-1700 (2-3) 1700-0230 (1) 0230-0500 (2-3)	0600-1300 (2-3)	0630-1230 (2)
Japan	2200-0100 (1)	1400-1600 (1-2) 2000-0230 (1-2) 0230-0530 (2-3)	0930-1200 (2-3)	1000-1230 (1-2)
Philippine Islands & East Indies	Nil	1330-1900 (2-3) 2030-0230 (1) 0230-0330 (2)	1000-1200 (1-2)	Nil
India	Nil	1330-1830 (1-2) 0130-0300 (2)	0000-0200 (1) 1100-1300 (1)	Nil

WEST COAST TO: (Centered on Sacramento, Calif.)	10 Meters	20 Meters	40 Meters	80 Meters
	ALL TIMES IN GMT			
Europe	Nil	1400-1930 (1) 1930-2200 (2-3)	0200-0500 (1-2)	0200-0500 (1)
South Africa	1800-2300 (2-3)	1300-2000 (1) 2000-2300 (2) 2300-0400 (3)	0230-0500 (1-2)	0230-0500 (0-1)
Central America & Northern South America	1700-0000 (4-5)	1300-1600 (4-5) 1600-0000 (3-4) 0000-0400 (5) 0400-1100 (3)	0230-1230 (4-5)	0300-1200 (4)
South America	1630-0130 (4)	1200-1400 (3-4) 1400-2330 (2-3) 2330-0300 (4-5) 0600-1230 (3-4)	0300-1030 (3-4)	0330-1000 (3)
Hawaii	2200-0000 (1-2)	1630-0000 (4) 0000-0400 (5)	0500-1430 (5)	0530-1400 (5)
Oceania	2100-0400 (3-4)	1630-1830 (2-3) 1830-0400 (1-2) 0400-1030 (3-4)	0700-1330 (3)	0700-1300 (2)
Japan	2200-0100 (1)	1730-0300 (2) 0300-0630 (3)	0900-1300 (2-3)	0930-1300 (1-2)
Philippine Islands & East Indies	2200-0200 (2-3)	1530-1900 (3) 1900-0500 (1-2) 0500-0830 (3)	1030-1300 (1-2)	1100-1200 (1)
Alaska	2300-0200 (2)	1730-0200 (2-3) 0200-0700 (3-4)	0630-1400 (3-4)	0700-1330 (3)
Marshall Islands	2000-0200 (4)	1800-0300 (2) 0300-0800 (3)	0730-1430 (3)	0800-1400 (2)
India	0130-0300 (0-1)	1500-1800 (2-3) 1800-2200 (1-2) 2200-0600 (0-1)	1230-1400 (1)	Nil

Symbols for Expected Percentage of Days of Month Path Open:

(0) None (1) 10% (2) 25% (3) 50% (4) 70% (5) 85% or more.

the VHF news

Conducted by
W. E. McNATT, W9NFK*

VK5GL and VK6BO Approach U.S. DX Record on Two

On December 30, 1951, **VK5GL** and **VK6BO** made two-way contact on 144 mc over a distance of 1151 nautical miles (about 1330 statute miles!) The present U.S. 2-meter DX record is held by W6ZL, Glendale, Calif., and W5QNL, Texarkana, Tex., about 1390 miles. The contact was made on June 10, 1951. The VK2AH—ZL3AR contact on December 15 (see page 45, **"CQ"**, Jan., '51) represented quite a long haul, too, but the mileage is not available at this writing.

VK5JD **(WIA VHF Rep.)** who kindly reported the VK5GL-VK6BO contact, says that VK5GL uses 18 watts input to an 832, a crystal-controlled converter and a 4-over-4 beam. According to weather data submitted by VK5JD, the unusual DX may have been produced by atmospheric superrefraction. (It's summer down there!) However, since 50 mc was open, it may have been caused by E_s. More on this, later. Needless to say, interest in VHF in Oceania is expanding rapidly. VK5JD may enlighten us, further.

Six Meter Activity

Sporadic E layer activity during December produced some enjoyable contacts for the devotees of 50 mc. "Grid", **W1GJO**, picked off W4RBK, the only signal heard, at 1918 EST, December 13. The 16th was good, with WØQIN and W9GDD worked in the morning. In the late afternoon, 1610, things began to happen. Grid worked W9VZP, MHP, MFH; VE3AET, AXT, DDT; W8CMS, GZ, UZ, SQU, LPD; WØBJV and QIN between 1610 and 1743 EST.

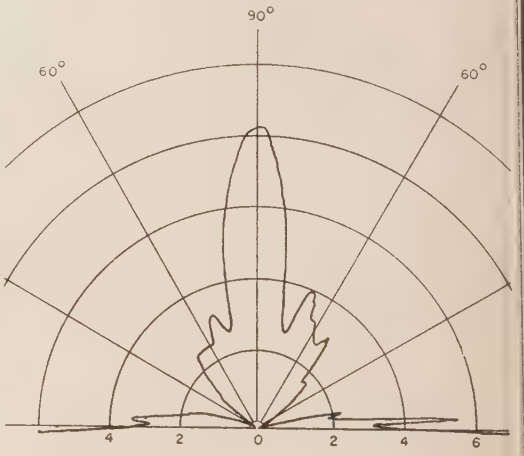
W5FXN, Austin, Tex., worked W7QLZ at 2120 CST on December 2, for the only contact. But, on the 18th, Jim heard WØCJS, W4FBH, W4NUW and worked WØMZJ, newly on 6 in South Dakota, W4FBH, W4RBK, W9MFH and W9ZHL between 1835 and 2000. Peculiar thing on W9ZHL: his beam was frozen and pointed due north. Jim has 32 States and 5 Countries, all confirmed except for the New Jersey contact. How about the card, OM?

Mel Baer, **W6WSQ**, is another 50-mc operator who adds the plea, "Six has been open many times during the fall and winter months, but not many stations are on to take advantage of it!" On New Year's eve, W6WSQ worked old standbys W5SFW and W5MJD, 2150 to 2215-PST. Signals were very strong, according to Mel who could hear the New Year uproar in the background of W5MJD's modulation when midnight came in Amarillo.

W7FGG, Tucson, Ariz., reports that there is a nice group on 6 in his area. Interest in Civil Defense is believed to be the reason; but, wait until the boys experience some of the openings; their interest may expand! W7FGG's monitoring of the FM broadcast stations, last summer, showed that the MUF seemed to run high on Mondays and Tuesdays between 1000 and 1200 MST, when activity is usually low. Iowa and Chicago FM stations were identified.

**Send all contributions to W. E. McNatt, W9NFK, 2433 Elder Lane, Franklin Park, Ill.*

In Ohio, **W8UZ**, Columbus, heard W5s MJD and SFW at 2010 EST, December 9. Both were S9 plus. Georg worked SFW, but heard no others. Yet, later, he hear W5MJD and SFW working W8s and 9s. The band close at about 2110. On the 16th, several CQs brought no re sponse, but at 1500 EST, VE9RA (beacon) was heard very strong, and then the VE1 gang came through W8UZ worked VE1WL, BC, QY; heard VE1QZ an worked W1PWW between 1513 and 1600. After a shor break, George returned at 1640 and heard W1HVP an W1HDQ: worked W1GJO, RDA, FZ, HVP, CTW.



Horizontal radiation pattern of a 5-element 6-meter array. This was taken on the NBS model antenna range.

W8GZ, Columbus, was also active. The band held open until 1845, and signals were very fine while it lasted. W8UZ feels that the 50-mc gang was really encouraged by the mid-winter activity.

Tom Spence, **W8NQD**, Ashland, also enjoyed the openings. On December 9, he also heard W5MJD and SFW, the only ones coming through. On the 16th, an excellent opening to VE1 and W1 was also observed by Tom, who missed the early part but worked W1CTW, RDA, FZ, HVP and DJ. On the 19th, a fair opening occurred to the south and W4LAW and W4GFE worked W8NQD. The 23rd was good; VE9RA (beacon) came through well, but only one VE1 (unidentifiable) was heard. Tom points out that in most instances of winter-time openings, there is not sufficient activity to bring out the quality of the openings. Several good openings have occurred in which only two or three stations were heard.

W8KUW, new to v.h.f., has an 829B on 6 and 2. The antennas are a 3-over-3 on 144 mc and a 3-element on 50 mc. The receiver is a VHF-152A into a 240-D. Power input is about 75 watts.

WØSZU/5, Ft. Bliss, Texas, also got in on the December openings. On the 21st, Clint worked W6TMI and W6WSQ between 1840 and 1938 CST. On the 15th, W6GCG at 2005 and, on the 18th, W5FSC and WØCJS. Clint would like to see more 6 meter news. Well, when we get it, we print it, hi! WACAW. Carrol Gustafson, PFC, is also at Ft. Bliss.

"If only all the summer gang would remember that 6 still exists in winter! We feel that many, many contacts would have been made . . ." writes **VE7AAH.** The December openings arrived late in western Canada. On the 23d, at 1615PST WØFKY was heard working W7HEA and, at 1625 VE7AAH worked him. VE7NM and TE were also active. WØFKY was the only signal heard and lasted until 1733PST with S8-9 signals.

On the 27th, VE5NC was worked at 2115PST, R5 S9 both ways. WØQIN/Ø was worked at 2127; QSB was severe but he peaked S9. W7FLQ was heard CQing on c.w. On the 28th, about 2030, VE5NC and W8CMS were heard. The latter peaked to S8 in QSB. At 2115, VE3AEI was contacted. QSB was heavy, but signals peaked S8 to 9, bothways, reports VE7AAH.

VE7DU reports that on December 30, 1130, W6EIB was heard in a local ragchew, expecting W5 opening. At 1830 PST, W7FGG was heard working W7HEA. On the 27th, VE7DU also worked WØQINØ and VE5NC.

VE7AAH recently worked ZL1ABO on 10, and learned that the Ls and VKs have been enjoying peak activity on 6. A1ZLZL districts and VK2, 3, 4, 5, 6 and 9 were represented, with stations stacked 10 deep! The openings have been very consistent and seem to occur generally around 1130 for an hour or so; then, from about 1200 to 2200 or 2300. ZR2CG and ZR2AA were to have been on by the time you read this. They'll be looking to the Canadian and U.S. gang for QSOs.

420 Mc. Notes

W2QED, Seabrook Farms, N. J., says that activity dropped off somewhat in December as a result of cold weather, the holidays and Ken's vacation, he believes. Yet, W2QED reports contacts with W3AIR, W3BSV, W3RKQ, W2EH, W2HEK, W3NAG and W2BLV during December 5 to January 7th. W2HEK and W3RKQ were new 2-way contacts; several others were cross-band, 420 to 2. **W2HEK** uses a radar jammer, and **W3RKQ** is trying to master a crystal controlled rig. W2HEK has an ASB-4 with a 6J4 r.f. stage added. The antenna is 16-element screen reflector beam in the attic. W3RKQ has an APS-13 receiver with a 6J4 r.f. stage added. He uses a 5-element Yagi, outside.

W3NAG uses crystal control, an 832A tripling from the 2-meter rig. His 40 element beam puts a nice signal into W2QED over the 40 mile path in any kind of weather. Since Dick went on the evening shift at the TV station, he hasn't been as active.

W2QED reports that **W2EH** now uses an AX-9903 tripler and is working on a straight-through final using the same bottle. W2BLV is the first and, so far, the only 420 mc station Ken has found on with the Technician class license. He also has a Novice ticket and is quite active on other bands.

Equipment at W2QED consists of an ASB-7 with a built-in lighthouse tube r.f. stage following a 6J4 r.f. stage. Also, a 6J6 r.f. stage is occasionally used in place of the 6J4. The transmitter is complete and independent of the 2-meter rig. Operating on 435.6 mc, the rig starts with a 6-mc crystal stage times 2 x 2 x 2 x 3 to 144 mc. straight through with an 832A driving an AX9903 tripler which drives another AX9903 as a final. The antenna is a 32-element beam 70 feet high, fed with open-wire line.

The East Coast 420-mc gang has swung strongly to crystal control and, as a result, most of the fellows are working on more selective receivers. Bigger and bigger beams are the order of the day, according to W2QED. All 420-mc stations known to W2QED are now **horizontally polarized.** As for activity, Ken says, "In the two seasons I've been on 420, I've worked 35 stations, some of which are not on anymore. Of the 35, about 19 are what you would call 'really active' stations. We're plugging the band every chance we get. Gradually, more stations are getting on. With enough activity, 420 could be just as good a band as two meters."

W2BLV/WN2BLV (Technician/Novice), Haddon Heights, N. J. reports a 420 opening of last November 15th. He worked W2TP, Leonia, N. J., about 90 miles: W2QED, 40 miles; K2AH, E. Orange, 55 miles; W3NAG, Havertown, Pa.; W3OFK, Yeadon, Pa.; W2EH, Collingwood, N. J. The rig at W2BLV is a radar jammer using a pair of 703-As into a 10-element horizontal beam. Keep up the good work, George!

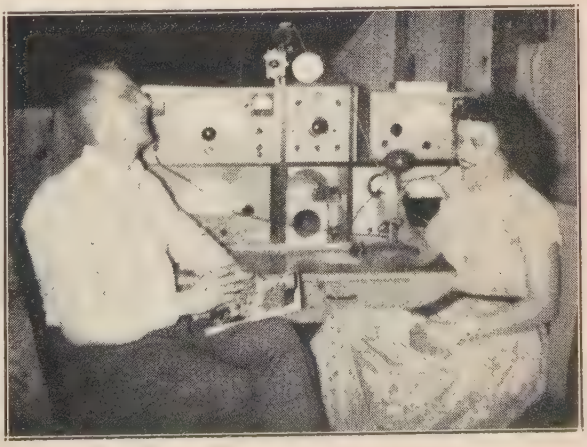
W2OSS, Trenton, N. J., wants it known that W2ZJD and he are operating on 420 mc with modulated oscillators. They listen on the band every weekday evening (Monday/Friday) at 1900, 2000 and 21100 EST, tuning for 5 minutes. Both stations have been using 16 element arrays and plan to have 32-element beams up by this time. These fellows will be glad to hear from other 420-mc operators in the area.

W9MBI, Clare Reynolds, Coleta, Ill., is in full agreement with the suggestion of W1HDQ and VE5JK (see **"CQ"**, Dec., 1951, p. 36) for the subdivision of types of operating on 420. Clare hasn't been very asctive because of an infection which laid him low in December.

On Christmas Eve, W9ZHB and MBI celebrated their first year of operating on 420 mc. During the year, very consistent contacts have been experienced, with QSB occurring only a couple of times even though the 2-meter signals would fade completely out at times over the 40 mile path.

The Two Meter Gang

W1GJO reports no special conditions in Massachusetts but says there's considerable activity as evidenced by his contacts with 268 different stations during the past year and a half at Westminster. Yet, Grid says it's a big band and more activity can be accommodated. Same for 6 meters: much, much more activity is needed when the DX is **not** in.



WØURQ and XYL, who is quite a 6-meter fan. She's an expert on the dial, and has reported RASO data in the past. All the equipment shown is home-made. Cliff makes his own dials, too.

WN1TTG/W1TTG, Melrose, Mass., says, "I enjoy 2 more than any other band. I operate 80 c.w. so as to get a General Class license, and have BCLd the other bands for years, but I find 2-meters the most stimulating and interesting, so far. An 829B final is nearly complete, but classes at Northeastern U. limit work on it.

Ed Goodhue, **W1PIV**, erstwhile 2-meter strong-man in Massachusetts, has been inactivated for the past 2½ years by an E.E. course at Worcester Tech. Another reason for Ed's inactivity is that the wind took down the 32-element beam; too bad!

The Western New York gang was out in full force on the 5th V.H.F. Sweepstakes. About six Novices are now on two, according to **W2RUC**, who states that **WN2CJA** is a YL on 2, W2UYG, her dad, is also on 2 . . . W2SKN is working on a new p.p. 24G final, while W2UHI, RPO, ORI and RUC are all using p.p. 24Gs . . . W2QEE is back on 2 after an absence of two years. W2RUC was on 75 for about a week; TVI drove Ken back on 2, where he uses a 4-over-4-over-4; a 420 square-corner reflector is used on 2/3 meter. Ken says, "I wish W9—would QSL our QSO of October 30, 1950; I sent him a card." Wouldn't it be nice . . . !

W2YXE, Troy, N. Y., says that his call can go on your list of 2 meter stations using c.w. "In fact," says Paul, "if more 2 meter men were willing and capable of using c.w., this station would work a lot more of them. I hear weak phone stations, unreadable, on a number of occasions when, if they were using c.w., it would be no trouble at all to make contact. W2PAU and I get our c.w. 'practice' every Tuesday at 2230 EST. The distance is about 200 miles, airline. In the last 15 weeks, we have failed to make contact 5 times, 2 of which were during the holidays; I'm not accusing Brownie of being too weak to get to the shack!"

At the least suspicion of an auroral opening, Paul advises, he will be on with the beam due north, horizontal, calling CQ. A new method of detecting Aurora, locally, is needed; WWV's warnings are seldom in phase with local conditions. The rig at **W2YXE** is 110 watts input to an 829B final to a 5-element flip-flop double Yagi. The receiver is a crystal controlled converter into an RME-69. The operating frequency is 144.207 mc. The elevation is 70 ft. above msl; the antenna is 40 ft. above ground. "Surrounding hills? Oh, brother!" says Paul.

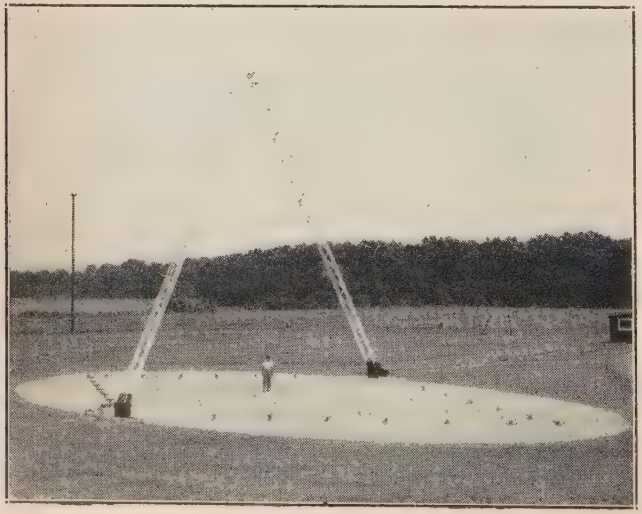
W2PAU reports the VHF SS Contest was, according to some reports, the best to date—at least in the Camden-Philadelphia area. Scores ran pretty high—at least up to those of last year. W2BV, working two meters exclusively, got 181 QSOs in 9 sections. W2NLY, also on two meters, was maybe a little higher than Burrill. W3KKN worked both six and two meters but was still nosed out by W2BV. The Club rivalry seemed to be primarily between the **York Road Club** and **The South Jersey Radio Association**. At the moment, it looks like a dead heat, with both clubs showing close to 30,000 points.

W2PAU had to work the first night of the contest but managed to run up 130 QSOs in 7 sections, plus 21 QSOs from the car, riding home from the job. W2GMY, operating mobile during a trip from N. Y. to Delaware and back, worked a lot of the local boys! Sure missed W4AO—who is still in the land of the Eskimos. His absence made Virginia a little hard to get from here. W2JAV made it by getting W4JCV on **RTT** autostart! WN2UMF and W4HBD tried to fill W4AO's boots, but the lack of power was a big handicap. W3PZL operated portable from West Virginia and gave several of the N. J. gang a crack at that section. Conditions were pretty punk—though the stations from Connecticut, Rhode Island and Eastern Massachusetts were breaking through down this way on a few occasions. Guess that they didn't know there was a contest on! But most of the serious contestants around these parts managed to land Connecticut, and some of the six-meter gang got into Western Massachusetts, thanks to W1RFU. In short, it was a **good** contest, and already some of the boys are saying, "Wait until next year!" By the way, W2APB was operating portable from his room in the hospital! Low power and a punk antenna location cramped his style some, as did the nurses who insisted on putting a thermometer under his tongue **just** as some rare contestant stood by! (These clubs will go to any lengths to get a few more QSOs!)

Jim Kmosko, **W2NLY**, South Plainfield, N. J., was very inactive between October and January, but he's now back with us. On January 1, he worked W2SPL and called WN8ORI. The rig still runs 50 watts input with a 48-element beam, and Jim would like to pick up at least two more States on the low power, for a total of 20, before going to the high power rig. However, Jim says the high power will be put on in a hurry for WØ, W5, W6 or W7; at present, his ambition is to QSO WØ on 2. As of January 1, W2NLY's score was 18 States, 6 call areas, VE1, VE3 and DX 750 miles. Jim is building a new antenna for Moon DX experiments this spring. He will use an automatic keyer transmitting dots every four seconds. A schedule will be set up with W2AZL, W2QQF and anyone else interested (write P.O. Box 8, South Plainfield, N. J.). High power will be used on the Moon Tests.

Pennsylvania Pointers

W3PBR, Havertown, Pa., sent in a very interesting review of the activity certificate idea used by the local gang over 2½ years ago, with approval of the "F.F.O.T." certificate idea. Mason's gang really had a lot of fun with their anonymously-awarded certificates, which eventually developed into a v.h.f. banquet meeting . . . Connie, **W3QMO**, Philadelphia, says that, until recently, he would have considered W3NXT, W3IBH and himself as eligible for the "Faithful Few on Two", inasmuch



The National Bureau of Standards Model Antenna range. The inverted "V" type structure is believed to be the largest ever designed for this purpose. It supports a test antenna about 50 feet above a ground plane (shown in the cover photo). Modern model techniques are employed based upon electrodynamic similitude.

as they were on every evening. However, W3QMO has been inactivated by the pursuance of an E.E.B.S. at the Univ. of Pennsylvania. But, Connie hopes to be active in March and, during the summer, will operate W3QMO/1, "Beech Hill", west central Maine, with 100 watts to a 10-element W2PAU "flip-flop."

Ol' Smitty, **W3GKP**, crawled out from beneath a reviring of the Christmas train and a little tonsilitis to report that W3OII now has 4-65As; a new station in Washington is **WN3SFY**. The most consistent Novice station in the Silver Springs area is **WN3SBY**, who just moved in and is /4 in nearby Virginia. W3GKP is eyeing a new, high-elevation QTH! H'mmmm!

The real credit for keeping 2-meters alive belongs to the "small fry" who are in there, almost every night, but get snowed under when the "big shots" smell an opening. — "A Reminder."

W3LNA, Larry, reports activity still exists, although the center seems to have shifted towards the Warren, O., area. The advent of W8CMS on 2 was very impressive; his signal was very husky in Greenville, says W3LNA. W8CMS is also promoting interest in 6; FB! Most active 2-meter stations in W. Pennsylvania - E. Ohio area are W8QI, CMS, BXA, HLX, HLA, WN8HOY and W3LST, CJF, CJB, KWE, KXI, KWL and LNA. Some of them can be heard every night. The Erie, Pa., and Pittsburgh gang has been quiet.

Down South On Two

December propagation was good to the 2-meter gang in the south, as well as the six-meter men. Abnormally warm weather and air-mass migrations produced several exciting openings, even as far north as Illinois. Paul, **W4HHK**, Collierville, Tenn., on the morning of December 30th heard one of the Texas gang talking to W5JTI, Jackson, Miss., at 1034 CST.

Firing up the rig, quickly, Paul worked W5AXY, BDT (Austin), W5QIO (Beaumont) on c.w., and W5UB (San Antonio) on phone. These contacts were made at almost high noon. The best DX was W5UB, over the 600 mile mark. Poorest signal was from W5QIO, which required c.w. Either the fellows were not on, or it was strictly a "pipeline" (duct) to Austin and San Antonio. (VHF Ed. Note: In view of the reports from the Houston area gang, Paul, I'm sure it was a matter of Tropospheric skip, such as has been observed frequently in other areas.)

Trouble with the big rig kept Paul off the air until about 0100, Dec. 31. W4HHK managed to work W5RCI, Marks, Miss., at 0153. He and W5JTI told Paul they had worked numerous Texas stations, some in Alabama and a few in Georgia. During the evening hours of December 30, W4JOW, Memphis, was hearing Texas 2-meter stations on his VHF-152A with a horizontal dipole, but had the misfortune of trouble with the 522 transmitter, after being heard by a Texas station. (What's with "DB", Paul? - **VHF Ed.**)

Active on 2 in Tuscaloosa are **W4KUX, HCV, NJP, ELX, GOF, LRU, TXK, KCQ and WN4TLV.** Soon to join us are **W4EQG** and **LEN**, reports **W4KCQ. W4FSW** and **FIG** are on nightly in Birmingham with the Tuscaloosa group active at 8 or 9 p.m. CST every day in the week. **W4RTI**, Birmingham, is semi-active due to press of other matters.

W5ML, Oil City, La., is all for the "Faithful Few On Two." On December 30, Art noted that Ft. Worth and Dallas TV channels 4 and 5 took over locals. At about 2100, Art's company left, and he got on 6, heard nothing and went to 2. W5AJG, ABN, CVW, HD, AQS and FEK were yakking about Alabama, Georgia and, perhaps, Florida and North Carolina! "I called W5AJG, and Leroy told me the band was trying to open to the east, and that Tim, W5JTI, was calling Alabama stations to alert them that the western gang was on," Art reported. Thanks to good ol' Tim! Art put his beam to the east and heard W5RCI, NYH, QFD and JTI calling CQ 2, Alabama, Georgia, Florida, etc. But, they didn't answer W5ML. After consultation with W5JTI, it was decided that W5ML, at 144.005 mc, was too low in the band. (This happened to me! - VHF Ed.) Tim did some fast coordination, and Art worked W4s KCQ, FSW, FIG, and LRU heard, KIP and LRR.

Two Meter Topics In Texas

W5FEK says the Houston, Tex., gang doesn't like the "skip" type of 2-meter openings. "On December 30, the W4s rolled into Austin, 150 miles west and north of Houston, and all we could hear were weak carriers!" Waldo complains. The same thing has happened on several previous occasions. (We get the same "skip" up here, too, on occasion. - VHF Ed.)

W5ON and **GLS** got **W5JTI** for State number 3 . . . **W5UB**, San Antonio, added two new ones with W5JTI and W4HHK. . . . **W5FSC** and **GLS** hooked W5RCI for their first QSO with Rex . . . **W4HHK** made number 5 for W5AXY, Austin, who then hooked KCQ, Tuscaloosa, Ala., for number 6 . . . **W5DCV** worked W4KCQ, FIG, and FSW . . . W5FEK received W4FSW's card for number 7, 572 miles. Since then, the boys have been resting and bragging while the band is good for only 150 miles or so.

W5FEK comments, "This is a good time to speak of W5JTI's courtesy and thoughtfulness in his operating. Tim is always looking for stations that have not yet worked Mississippi, and he struggles to make a contact that many operators would give up. He has made innumerable phone calls to Alabama and Georgia 2-meter stations, to urge them to listen to the west. His operating is something that all of us could do well to duplicate."

Over in Port Neches, John Naff, **WN5TFW**, felt that the band would pop because, on the night of December 29, signals were very good from the Houston and Louisiana gang. WN5TFW worked W5 AXY, AJG, and JTI in the short time available.

W5AOA, Sulphur, Louisiana, is back on . . . WNs in Louisiana are heard from time to time, but not consistently, yet. W5JBW, MKP, EVQ, AOA and GIX are mainstays in Louisiana; in the Sabine area, W5QIO, QME, STP, AVW, DSB, and WN5TFW hold forth most

The impromptu meeting of the VHF gang, Seattle, 1951.

frequently. Conditions on January 7 were good, when W5JBW, STP and PMM were worked.

Reporting from Ft. Worth, Bill Bonnell, **W5CVW**, happily announces that WN5TLY, Ft. Worth, was the first Novice licensee on 2, there. He uses a 522 and a 3-element beam. W5AIT, about 100 miles southwest in Hamilton is again active. Another newcomer to two is old friend and DX hound, W5HHU, Dallas. W5TSF puts a good, consistent signal in from Grand Prairie.

W5CVW got the new 4-over-4 beam up, day before Christmas, with the aid of W5DFU, who was in town for the holidays. Warren's efforts on Bill's behalf paid off, beginning the 29th. Fading signals fading in and out from Waxahachie, Palmer and Grand Prairie. At 0600, the 30th, Gulf Coast signals were R9 plus. W5CVW worked W5QIO, JTI, JBW, W4KCQ, W5RCI, and W4LRR. the two W4s making numbers 8 and 9 States for W5CVW. W5HD also made the most of things.

The weather, according to W5CVW, was just right. A good high-pressure area extended from the Gulf over Texas, Arkansas, Mississippi, Alabama and Georgia. A good inversion existed over the area at elevations from 2800 to 4000 ft. Temperatures ranged between 70 and 85° F at the inversion heights. Added to this was warm, moist Gulf air. On January 3, W5CVW received the long-awaited QSL from W2PJA/6 (now W6PJA) confirming QSO on 2 last June when the record was set by W6ZL-W5QNL. The score, accordingly, is 10 States, DX about 1180 miles, for Willie.

Ex-**DL4XS**, "Jo", is home from Germany, and is now located in Midwest City, Oklahoma. DL3KE is now sole proprietor of "Radio Hill", Weisbaden. Jo's last Stateside VHF work was as W6TPN in Los Angeles in the late '30s on 2½. He is now staring at the Oklahoma terrain while awaiting the W5 call. Jo says, "Say, Bud, have you worked Oklahoma on 2, yet? If not, let me cordially extend my invitation to you to turn your beam this way, this spring. Operation will be largely c.w. for weak-signal work. I hope to interest the local gang; I can remember when there were only two of us on in Germany. Now, there's over 200 active, there!"

DL4XS/3KE's 2-meter highlights in Germany were:

1950—European DX Record on 2 with G2BMZ
1950—First two-way QSO on 2 with England, G3DIV
1951—First two-way QSO on 2 with Wales, GW5MQ
1949—50—51, Eight countries worked on 2.

Jo has his "70 cems" (420) gear along, too, but won't put it up until he becomes more familiar with the status of the band in the U.S. He does assert, however, "That every station now on 2 can be adapted to 420 for less than $20 and do the same DX that the Gs do! Think it over; we're way behind, over here!" Perhaps Jo can enlighten all of us with a full-rigged article on up-to-date 420 mc gear and practices. How about it?

Antenna at WN8HOH 32 elements 53 feet high at 730 feet above sea level.

The Western States

Mel Baer, **W6WSQ**, Pasadena, Calif., reports consistent activity, but little unusual DX except that the fellows in the beach area, on the waterfront, are working over the "hump" into Taft and Bakersfield with little trouble.

Several of the gang are watching closely for sporadic-E on 2, monitoring 50 mc, FM broadcast, etc., as indicators. Mel says that the average receiving equipment in the L.A. area is top-notch, low-noise Wallman Cascode grounded-grid converters. Most stations are using multi-element arrays, 10 elements or more. As for power, W6IBS is "king-pin" with about 500 watts input. W6NLI and ZL, and some others, are about ready to fire up "full gallon," however. W6WSQ now uses crystal-controlled Wallman Cascode converters on both 50 and 144 mc. The transmitter is an AX-9903 final with 100 watts input. The antenna is a 12-element horizontal.

W6NCP, over in La Habra Heights, found out quite a bit about 2 meter activity, recently, when he went back on 75 phone for a spell . . . According to **W6GRA**, Bakerfield, the 2-meter gang has formed a net of about 12 stations. GRA has two 15 watt FM rigs on 147.96 using 2E26 finals. These are used for expeditions to various mountain peaks. An AM rig, on 145.44 mc, 2E26 final, is used at the home QTH with a 16-element vertical 40 feet high. W6GRA works San Diego stations easily.

W6QPF, Dinuba (San Joaquin Valley) expects to be on 2 with an ARC-5 any day. In response to his inquiry about an antenna, Beck, W6NCP, told him to use what he would, but make it easy to change to horizontal . . . **W6FXU**, Huntington Beach, was also on the 75 phone QSO and was very nearly ready to go on 2; he may be on by now . . . Another 75 phone QSO with W7DVS, Las Vegas, Nev., revealed that Paul has been on 2 and has worked some stations at the Air-Force base, there. Tentative arrangements for 2-meter schedules are in the works, and 75 will be used for coordination of the tests . . . **W6MOE/6**, north of Barstow, was worked by W6NCP who bounced his signal off of Mt. San Antonio, to the northeast, R5 S9; maybe a 1 X 1 size could be put into Las Vegas, right on the same path!

W6FKH, San Bernardino, is quite active on 2 and has a vertical rhombic banking a signal off of Mt. San Gorgonio to work into the L.A. area. Ben has a son, Freddy, 11 years old, who received his **WN6IIM** ticket and is active on 2. FB! He's a good operator, and got a nice write-up in the San Bernardino "Sun-Telegram" . . . **W6MVK** now resides on the slope of the Sierra Madre range above Claremont. Tom should be active, again, soon . . . **K6BE**, of Temecula Valley fame, is now located in El Monte, and is back on 2.

W6PJA wishes that more fellows would become interested in c.w. on 144 mc. "I have been on, here, since the end of 1946, and it (c.w.) has proven much better to get that last QSO when the band is going out," Bob states. The weekly schedule with W7FGG, Tucson, Ariz., has been maintained every Friday night and Sunday morning on horizontal for the past 6 months, but with no luck, yet. Bob states that the 24 mark has been passed in the number of schedules. Keep at it, fellows! W6WSQ also works with W6PJA. Anyone interested in the trials should listen from 2100 to 2130 PST on Fridays; 0700 to 0730 on Sundays. Bob and Mel transmit east on the first 5 minutes, and listen; transmit south during the next 5 minutes, and listen, and so on. Bob reminds me that W6WSQ is also horizontally-polarized, only, as are a few others in addition to those mentioned in the December column.

In The Northwest

Hugh Compton, **W7MKW**, has been inactive because of a change of QTH, but he is now on an "antenna farm", well-elevated and fine for 144 mc . . .

W7BQX, Port Angeles, a 6-meter mainstay a few years ago, is now on 2 . . . **W7BLP**, Everett, has returned from KL7-land and expects to be on 2, soon; in the meantime, **W7DF** keeps Everett on the 2-meter map . . . **W7JOQ**, Seattle, is on 2 as is W7IEE, Mercer Island, WN7PRW, Bow Lake . . . Out Kent way, W7DNB and **EGV**, who "microwave" by day for Bonneville P.A., v.h.f. by night

for themselves and talk of high power on 2. Rube, W7EGV, has a pair of 4-65As he'd like to try.

Tacoma is represented by W7LRF, LUF, MZS and NIL . . . Rumors persist to the effect that a 350-watt station will be on 2 in Tacoma. Just who it is seems to be a secret . . . Olympia is top city for active stations with W7CMX, HMJ, IJZ, KLG, KNV, NEY, NGZ and W7PQR checking in. W7CMX and KNV have new 16-element beams. Most of the Puget Sound gang are on 145.8, plus or minus 50 to 100 kcs . . . VE7MT, Victoria, is the only VE7 consistent to the W7s . . . W7MKW goes on swing shift for about a month; how about W7CMX taking over for him?

Glenn Ritchey, W3FSO/7, Bremerton, Wash., is on call with U.S.N., so Glenn seldom knows where he'll be, next. But, he does try to get 2-meter news into these pages whenever he can spare time. (Thanks!) The Commander, we hope—by now—has been running tests on antennas and transmitters as well as duplex operations with W7WAZ, when time has been available. W7WAZ operates on 144.8 nightly, with phone patches; W3FSO/7 is on 147.96.

A new VHF publication originated recently in Montana. Published by W. R. Patte, W7MBV, Geraldine, Montana, "Montana VHF" is a little news sheet processed by duplicator-gelatine, I'm sure, because that's the process —and almost the same style—that Helen and I started "The VHF News", nearly 6 years ago. Even the Editor's Note, on page 1, is nostalgic to us. It states, as we did, "This paper . . . . is a non-profit paper issued once each month. Subscriptions are $.50 per year for single issue copies."

In O-HI-O

What a difference 4 days make: 96 little hours! On January 4th, Ken, W8WRN's report stated, in effect, "Well, not much, here, but I'm trying." Four days later, after the January 5-6-7 opening, Ken's second report was really full of business. The old spirit was back. I'm sure that Ken—and you—will understand the tease. Just shows how an old v.h.f. "fire horse" responds to the clang of an opening!

W8CPA contends that he'll be very active when he gets on, but he's got his eye on a new QTH . . . Ken, W8WRN, wonders about the response to the Two Meter Beacon station proposal. So do I. See the December and January and February columns. On January 5th, W8WRN was rejuvenated: at 9:45 p.m., it started: W8VOZ, WJC, UYL/8 and W8OQ. Signal levels were comparable to those observed during the summer. On January 6, W8WRN worked W8MFV, PTF, W9UOF/8, W8AQT, SVI, WN8HQK, W8BMO. (W8MFV, AQT, BMO, WN8HQK and W9UOF all new, all around Dayton—Cincinnati.) This activity was from 0952 to 1402. From 1930 to 2201, heard W8BFQ, W9NSF, W8HUX and W8VOZ; worked W8DQR and MGA. At 10:01 (2201) W4KZF, Ludlow, Ky., heard.

On January 7th, 0800 to 1100: heard W8BFQ; worked W8MFV: heard W4JDN (Who said Ross quit 2??!) W9UOF/8, W8ZOA, MGA, VOZ, W9EGH, W8GAB; worked W3OMY, NKM, W8FMW; heard W3RUE and W9EWO.

Another Novice licensee, Jim, WN8HOH, is on 2 in the Dayton area. Jim states, correctly, that "Dayton hasn't been mentioned in your column, yet, so I thought I would drop a line to you about our activity!" (Jim, that's the only way I can report activity in any area—someone has to send a report in! Thank you.—VHF Ed.) The Dayton gang works into Cincinnati and Erlanger, Ky., consistently and usually can work Margaret, W8BFQ, Everett, near Cleveland. W9UOF/8 was top-man in the Dayton area during the VHF Sweepstakes contest, with 51 contacts and 4 sections. WN8HOH was right behind him with 49 QSOs and 3 sections. W8BMO was next, followed by W8PTF with about 37 or 38 contacts and 3 sections. W9UOF/8 worked into Michigan, Indiana, Kentucky and, of course, Ohio; WN8HOH and the other Dayton stations worked Indiana and Kentucky.

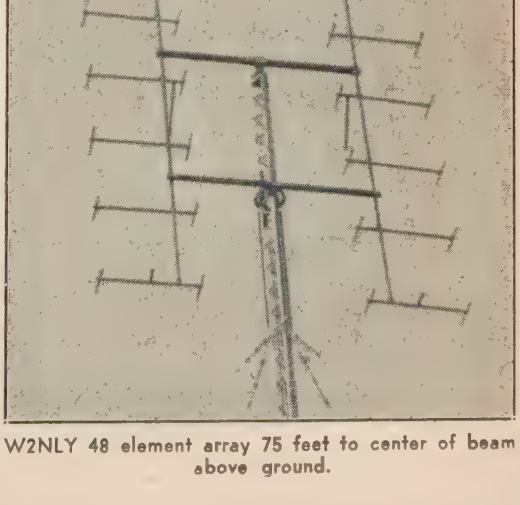
W8FKC, Hudson, found activity on January 4—6 "just like old home week on two." The opening extended from Ft. Wayne to Buffalo, and from Detroit to Pittsburgh: similar openings occurred on Christmas and New Year's Eve, but there was less activity. Regarding 220 and 420 mc, Ralph says W8WRN, DQR, WM, WJC and NKM are equipped, or becoming so; FKC will be, too, when he rehabilitates the gear . . . The Youngstown area has been fairly reliable on 2 for the past few months . . . W8GAB is very active; XYL, W8FMW, was in the hospital, but is coming along, now. Ben's 32 element job is down for repairs, but he's using a 5 over 5, temporarily . . . New calls on 2 in the area: W3OMY, Pittsburgh (back, again); W8ZPI, Cleveland; W8KUW, Ashland; WN8HLX, Youngstown. W8IJG, Cleveland, Technician class, is on 222.2 mc . . . Ralph's nominations for the "F.F.O.T." are: W8CMS, BFQ, WJC, GAB, FMW, VOZ, DX, NNF; W3KXI, QKI, WBM, RUE, NKM and KWL. Ralph also sent in suggestions for the qualifications.

Margaret, W8BFQ, found conditions very good on January 6 and 7, when the following were worked or heard: W9EGH; W4JDN; W3KXI, RUE, NKM, YWL, LNA, QKI; W8BMO, MFV, VOZ, CVQ, RWW, FQK, DX, CMS, BBY, JVP, FMW, GAB, DOE, YGM, AQT, GJF, EIM, WRN, EUR, EP; WN8HOH, HPI, INW, and W9UOF/8. Al Burson, W8WXV/ Ft. Monmouth, stopped in at W8WJC-BFQ on his return east, on the 7th, and had a nice time renewing old acquaintances. Activity is improving, rapidly.

Michigan Minutes

Our Michigan friends are still active. Les, W8PYY, Jackson, reports "F.F.O.T." candidates number 12, W8BAN, BBY, FMG, FRN, GXE, HKJ, KCM, KKB, PYY, RHB, SSZ, and ZNI. Soon to be on are W8FYN, DZW and JSK. "Some change since 5 or 6 years ago, when my closest contact was 75 miles!" says Les . . . 145.6 mc is the net frequency for the Jackson gang, who meet at 2030 EST every Wednesday night. After roll-call, a standby is taken for other stations, and so far W8VOZ, VCQ and W9EGH have called in. W8BBY is acting NCS until EC W8JSK gets on 2. The gang is using little 6J6-6J6-2E26 rigs, 12 to 25 watts.

W8FRN, Jonesville, adds that most of the gang uses 3-over-3 Yagis. Ken uses a 12-element array with a 6J6-6J6-832 with 25 watts input. The receiver is a 6BQ7 Wallman cascode r.f. stage, triode mixer and a crystal controlled overtone oscillator . . . W8NNF gets home late, but gets on the air about midnight; says he will try schedule with Erie, soon . . . W8RXY hasn't been heard for some time . . . W8KCM shuffled off to Buffalo to new QTH; we'll miss him . . . W8PYY is new Poppa, now has 4 boys to help him put up antennas! Also, Les just finished a crystal controlled 2-meter converter; 14 to 18 mcs i.f.



W2NLY 48 element array 75 feet to center of beam above ground.

W9EGH, Goshen, Ind., found a lot of activity on January 5 and 6, on 144 mc . . . **W9FKI**, Ken Billings formerly of Rantoul, Illinois, departed for the 5th call area on January 10th. We'll hear from him when he's settled.

W9LEF's little girl, Diane, is now back in good health after a session in an iron lung. Lloyd says "Please tell the guys I am deeply grateful for their concern and help. It's almost impossible to thank everyone. It sure renews your faith in human nature to know that there are so many grand guys."

In and Around Chicago

W9PK reports that good sportsmanship was the keynote in the January VHF Sweepstakes, and it was something that our low-frequency brethren would really envy. About 70 stations were heard at one time or another. The deciding factor in the whole contest was the appearance, on Saturday afternoon, of the signals of W8VOZ who gave that "extra", hard-to-get, section multiplier. "My hat is off to Delbert," says Jack, "His patience with my weak signals paid off; he had already worked W9UMG."

Outstanding signals from each section were: **W9HKQ**, Indiana; **W9EQC**, Illinois; **W8MRK**, Michigan; **W8VOZ**, Ohio; **W9 BTI, UJM, TQ, LJV and AFT**, Wisconsin.

W9EQC, Aurora, and **W9PK**, Downers Grove, battled it out (friendly, mind you) for the top spot in the contest in Illinois. Insofar as present information points out, W9PK won by virtue of his Ohio contact with **W8VOZ**. Dick, W9EQC, almost squeezed out an Iowa contact, but didn't squeeze tightly enough . . . Several WN9s are active in the Chicago area, but not all calls have been reported. Leo **WN9OKF**, is active with an improved rig; still laid up . . . **WN9PUW** was in there, pitching, on his first s.s. party . . . **WN9QCG** (W9LLZ's boy) wants to work 2, but is sticking on 80 c.w. until he gets the c.w. rate up to snuff . . . Activity very good during contest, as usual; quiet, afterwards, as usual. The regular gang is still active, although the gang is not on, en toto, every night. After all, other matters require attention, too . . . **W9VNW**, Hubbard Woods, is well known to thousands of hams, but not as a ham. He is Rex Maupin, leader of the orchestra by the same name on a.m. broadcast networks . . . **W9TGI**, Glenview, is back on, as is **W9TGB**, "Gussy", Franklin Park, who will have a two meter beam atop the 20 meter beam as soon as the weather permits. The folded dipole will be retired . . . **W9VX** expects to resume activity . . . **W9GDM**, Wheaton, conquered drive trouble . . . **W9UMD** will have rotator electrically controlled . . . **W9AYM, UMD, DRN, IWE, VX** are equipped for 420; expect more to be active . . . **K9FAS**, O'Hare Field, improved the station with a better beam and dual conversion from the ARC-3 transmitter . . . **W9JGA** and **NFK** were highly pleased by Christmas presents of barometers; now compare millibar readings . . . **W9ZNX**, Morton Grove, operates both 2-meter AM and FM. Will do better on AM with an outside rotatable beam when weather permits . . . **W9ECA** doesn't read the column; just asked NFK if AM on 2 meters is active! As a result, the r.f. front-end of the ARC-3 at W9ECA/QBH underwent conversion for 2, and a rotatable horizontal beam will be atop the 10 meter beam, when it is rehabilitated . . . **W9KJU** improved the rig, very much . . . **W9CT's** beam was damaged by winter winds and ice; Walt has been very QRL, starting his own business. Good luck . . . **W9KCW** uses 2-meters effectively for termination of ILN traffic . . . **W9CX**, Oak Park, fighting TVI, is active on Sundays, mostly . . . **W9WOK** has been inactivated by a combination of business responsibilities and home renovations . . . **W9DXX**, Homewood, is back on 2 meters a.m. after the modulator was repaired. Alice is also on the 147.5 mc FM "Party Line Net," too.

WQLEF's daughter, Diane, is now on the road to recovery after her recent occupancy of an "iron lung".

The 147.5 mc FM "Party Line Net" has grown, considerably. Recent additions are: **W9DXX**, Homewood; **W9AIO**, Beverly Hills; **W9KIU**, Chicago; **W9FAB**, Winnetka, **W9MYC**, Western Springs, and her son, Bob, **W9DWD/mobile**; NRU, Riverdale; PSP, "Pint-Size Phone" (4 watts), Chicago. **W9QDA**, mobile, had transmitter-frequency troubles, but should be OK, by this time. During Civil Defense exercises, the net is known as the Medical Communications Net.

Hod, **W9ALU**, Metamora, made a suggestion, last summer, that should be considered, right now, for the best results, this summer: how about voluntary withdrawal from the low end of the band—where the QRM is so terrific on 2-meter openings—and shift to higher frequencies without everyone choosing the same higher frequency spot? Also, tune at least to 146 mc. Perhaps we should describe the G's zone plan, as ex-DL4XS suggested. The idea is to have the 2-meter gang in various parts of the country to occupy a certain portion of the band, and thus reduce local-area QRM during openings. Please don't offer the low-frequency man's argument that "propagation should be better" at 144.001 than at 147.001 mc! If your gear is in proper order, including the antenna, no significant difference should be expected.

W9EQC, Aurora, reports that W9KQX, Springfield, seems to be more active than any of the southern Illinois gang . . . **W9MAL's** signal has been crippled by a low antenna and transmission line trouble . . . **W9LOZ, KLR, NRD and NJS** are all new Indiana stations . . . In DeKalb, Illinois, **WN9QGU** is active . . . On January 5, **W9EQC** worked W8VOZ; not bad for winter-time operation . . . **W9EHX** got back on 2 after a long absence . . . **W9EWO** put in a fine signal on Jan. 6.

"Badger Milk-Run"

In Milwaukee, **W9TQ** has the teletype working, on the air. Anyone else getting ready? Vic says the W8s were pouring into "Suds City" on January 8, but—being involved in local ragchews (like Chicago innumerable times)—they didn't hear the Milwaukee calls . . . **W9DDG**, Sheboygan, was all set for RTTY QSO with TQ, but blessed event at DDG forestalled it . . . Noontime schedules with **W91MQ, LJV** and **KQM** continue well, but **PK** not heard recently, nor **LUQ** who was on different work schedule . . . Sunday morning regulars are **W9FAN, BTI, LJV, NVK, KQM, IMQ, NZ; NW** missing, lately.

Milwaukee Emergency Net on 144 still functions, includes **W9BTI. BTQ, LJV, UJM, GZR, YYY, WTL, GAH, YFT, NVQ, ESJ** and old-timer, but new, here, **W9GSP**.

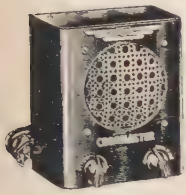
W9WWH sold receiver and beam to NVK . . . **KZU** uses KZZ's beam . . . BTI, building and building . . . **YYY** settled in "palace" but has some problems left . . . **LJV** operates airborne when possible . . . **FAN** has new beam and crystal converter working . . . **GIP** on soon with 522, with BTQ helping . . . **GAH** has a.c. power supply and can give the put-put a rest, but made portable tests in January . . . **GSP**, de-hummed. **LPF**, very busy. **AFT** seldom heard; must be new job . . . SWL Bob Podewils, Milwaukee, plans to get the Novice ticket, soon. Says W9OOF, technician, found no sigs on 420; now has his general class ticket . . . **W9FES** is back on 2 with a 522 and an 8 element beam.

Kansas City Notes

Jim Switzer, **WØMNQ**, says the 'F.F.O.T." nominees are **WØDVV**, who has averaged well over 300 nights per

(Continued on page 54)

Code Practice Oscillator and Monitor



The BUD CODEMASTER is a real money-saver. No longer do you have to consider your code practice oscillator useless after you have learned the code. A flip of the switch and you have a good CW monitor. This is a really versatile instrument.

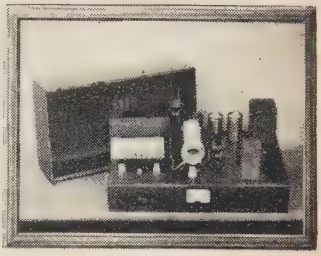
It has a 4" built-in permanent magnetic dynamic speaker and will operate up to twenty earphones. A volume control and pitch control permit adjustments to suit individual requirements. Any number of keys can be connected in parallel to the oscillator for group practice.

This unit will operate on 110 volts A.C. or D.C. An external speaker may be plugged in without the use of an output transformer. All controls are placed on the front of the unit and all jacks are in the rear. CPO-128

Also available without speaker but with phone jacks for use with earphones. CPO-130

See the complete Bud Line at Your Local Distributor or write Bud Radio. Inc.. 2118 East 55th St. Cleveland 3, Ohio, Dept. Q.

Designed for Professionals—Ideal for the Novice



Eldico's TR-75-TV is a 60 watt all-band cw transmitter sensibly priced, solidly designed for beginner and old-timer alike. The TR-75-TV is air-proved by hundreds in use, giving world-wide performance.

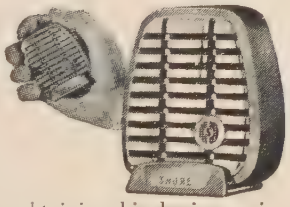
In addition to its many features, the TR-75-TV has special design precautions to insure minimum interference to television. Special shield and by-passing makes operation possible in TV areas.

Look at these outstanding features of the TR-75-TV:

- Simple enough for the beginner to assemble.
- Time-proven xtal osc. final amp. comb.
- 80-meter or 40-meter crystals cover all bands.
- Plug-in coils. All stages are metered.
- Husky pwr. sup. delivers 500 vdc to final.
- Pi-network output, ideal for multi-band operation.
- A terminal strip is provided to connect a modulator if radio-phone operation is desired at a later date. Eldico's MD-40 Class B 6L6 modulator is designed expressly as a companion unit.

Over-all size with cover 17" x 10" x 9". Complete kit (less crystal) including a smartly styled shielded cabinet to minimize TVI. For 110-120 v, 50-60 cycles. Free catalog available by writing Eldico of N. Y., Douglaston, L. I., N. Y., Dept. C-7-3.

"The Hercules"



In amateur radio, just like lots of other hobbies, there are all kinds of gadgets and accessories which one acquires in time as a matter of course. However, probably the first item a radio amateur requires, after obtaining his basic receiver and transmitter, is a dependable microphone, so voice "contacts" can be made. Regardless of whether you are a new-comer or an old-timer in amateur radio, the new Controlled Reluctance mike, the "Hercules" (manufactured by Shure Brothers, Inc., 225 W. Huron St., Chicago, Ill.) warrants your consideration. It is a hand-held magnetic unit that provides clear reproduction, high speech intelligibility, high output and ruggedness at an amazingly low price. Being magnetic, this mike is practically immune to varying conditions of heat or humidity. The "Hercules" can be used indoors or outdoors, fits snugly in the hand, sits firmly on a desk or can be placed on a stand. There are two models with an output level of 52.5 db below 1 volt per microbar. Model 510C "Hercules" lists at $15.00 while the Model 510S, which has a built-in switch, lists for only $17.00. The "Hercules" has a die-cast case, with a Metallic Green finish. See the "Hercules" at your Distributor or write Shure Brothers for further details.

"The Competitor"

Operating your own two-way station is now quite simple. With equipment smaller in size than most TV receivers you will be able to talk to fellow hobbyists across town, in other states, and occasionally, when conditions are good, thousands of miles away. If you always thought it took all kinds of high-priced special equipment to do this, stand corrected. Take, for example, the microphone you will use with your transmitter, the "sending" part of your station. An ideal mike, low in cost but high in audio quality, equally suited for hand, desk or stand use, is the Turner Company Model 60X, a moisture-sealed crystal mike popularly known as "The Competitor". This mike has — Response: 70 to 7,000 c.p.s.; Level: 52 db below 1 volt/dyne/sq. cm. The model 60X has a list price of $10.85 while model S60X, which has an "on-off" slide switch, lists at $12.85. For more information see your Distributor or write The Turner Co., 929 17th St. N.E., Cedar Rapids, Iowa.

Here is a device that will produce faultless Morse code from a typewriter-like keyboard.

The Codetyper

The International Morse code, by virtue of the rather haphazard manner in which it was originated, is not easily adaptable to efficient automatic communication. As a result, most automatic wire and radio communication systems have devised special codes. The teletype code is a good example. These special codes require machines for receiving as well as transmitting because these codes cannot be interpreted by ear even by an experienced operator.

The desirable solution to this problem is an apparatus which will produce uniform Morse code characters with a minimum of human element required for its operation. This Morse code could then be copied by operators using nothing more than the conventional receiver. The **CODETYPER** accomplishes this purpose. It is an instrument with a keyboard similar to that of a typewriter which will, with the touch of a key, produce perfectly formed Morse code at any desired speed of character transmission from ten to seventy-five words per minute (or higher).

In practice, anyone can, with a few minutes instruction and experiment, send code at twenty or thirty words per minute using this device. There are several obvious advantages to this equipment. Each character is perfect and the wide variation in dot and dash lengths which makes some c.w. hard to copy, known as "signature" or "fist," is eliminated. "Glass Fist" and "QLF" difficulties also disappear with the use of such an electronic code generator.

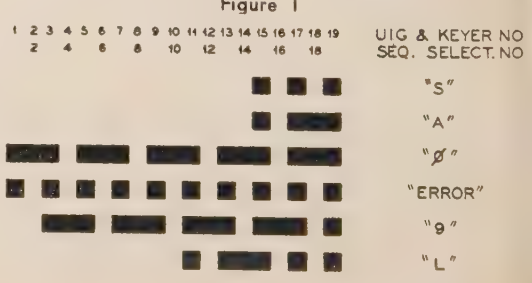
The designer of the **Codetyper**, Mr. Nathaniel A. Dorfman, approached the problem of sending Morse by automatic means in a novel way. He knew that it is best to operate vacuum tubes as on or off devices, that is, either conducting or not-conducting. If a tube is restricted to that latitude, the effects of aging of the tubes and the variations between tubes of the same type will have little effect on circuit operation. He took the three components of the Morse code (dots, dashes, and the spaces between the dots and dashes) and reduced them to two by the simple method of constructing the dash out of three dots with no space between them. In this way the "on" condition of the tubes form dots and dashes while the "off" condition forms the "spaces."

19 Unit Code

The Morse code consists of some forty-three different sequences of dots and/or dashes representing letters, numbers, punctuation, and special code symbols such as **BT, AR, AS,** and **SK.** If the dot is chosen as the unit of time, then the dash is three units long and a space is one unit long. Using this system the longest characters are the zero and the comma, both of which are 19 units long. The **Codetyper** therefore uses 19 "Unit Interval Generators" (one-kick multivibrators), one for each unit of time necessary to duplicate the code. **Figure 1** shows the 19 time intervals with a few selected characters. For example to reproduce the letter "S" it is necessary to let the Unit Interval Generators (UIG's) numbered 15, 17, and 19 operate the keying relay. The letter "A" is formed by UIG's 15, 17, 18, and 19. Thus you can see that the dots are made by the odd numbered UIG's and the dashes by the addition of even numbered UIG's.

There are forty tubes in the entire mechanism. In addition to the 19 UIG's (6J6's) already mentioned, there are 19 triode Keyer units (10-6J6's), 9 Sequence Selectors (2D21's), a monitoring code oscillator (6J6),

Figure 1



Codetyper Laboratories
550 Fifth Ave., N. Y. 19, N. Y.

and an Eraser circuit (2D21). The Keyer units are operated in two groups, odd and even. The odd numbered Keyers have B+ on their plates steadily, while the even numbered Keyers have their plate voltage furnished by the Sequence Selector thyratrons. The keying relay is in the cathode of the Keyer tubes, thus closing the relay whenever current flows through any of the Keyer tubes.

Sequence of Operation

Looking at **Fig. 1** again, it may be seen that when the letter "L" is pressed, a pulse is sent to UIG-11. UIG-11 pulses UIG-12, UIG-12 pulses UIG-13, and so on down to UIG-19. Each of these UIG's also applies a positive voltage to the grid of the Keyer tube of the same number, causing the tube to conduct (if it is odd numbered and thus has plate voltage). The letter "L" key, in addition to sending the starting pulse to the eleventh UIG also applies a positive voltage to the number 14 Sequence Selector (Sequence Selectors only operate the even numberd Keyers and thus only are numbered with even numbers). The Sequence Selectors, being thyratrons, conduct continuously after their grids go positive. The thyratron acts as a switch furnishing plate voltage to Keyer number 14, causing the keying relay to remain closed during unit interval 14. The keying relay is now making the letter "L". The last Keyer, number 19, sends a pulse to the Eraser thyratron. This acts to open a relay, removing the plate voltage from all of the thyratrons. The **Codetyper** is then ready to send the next character.

Since the **Codetyper** Keyer circuits operate a built-in keying relay, the instrument may be directly substituted for a manual telegraph key, bug, or electronic key. Two other special features are the monitoring oscillator, a phase shift oscillator of about a thousand cycles that terminates in an earphone jack, and the speed control, a small potentiometer which adjusts the duration of all of the Unit Interval Generator pulses simultaneously, thereby permitting adjustment of the speed of transmission of each character between ten and seventy-five words per minute. The speed control may be seen on the right side of the **Codetyper.**

Phantom Switch

An interesting facet of this apparatus is the so called "Phantom Switch." Inspection of **Fig. 1** will make it evident that a maximum of six separate triggering pulses are required for each character. The "Ø" (zero) for instance requires a triggering pulse to the number 1 UIG circuit and the number 2, 6, 10, 14, and 18 Sequence Selector (SS) circuits. Triggering the UIG-1 results in a series of ten dots, one from each of the odd-numbered UIG's. Triggering the SS-2, 6, 10, 14 & 18 results in filling in the spaces between five pairs of dots. The finished product is five dashes. To derive these pulses each key could be used to operate a six pole mechanical switch. Considerable mechanical difficulty would be encountered if 44 six pole switches were to be put in the space taken by the conventional typewriter keyboard. This difficulty is overcome by the Phantom Switch network. Using this, the keyboard need activate but a single-pole single-throw momentary contact switch. Switches of this type can be made physically small enough to fit in the restricted space available. At the same time the problems incident to back coupling and shunt paths are eliminated. In effect the Phantom Switch network permits a single-pole switch to serve the function of a multipole switch and turn on several different circuits at once.

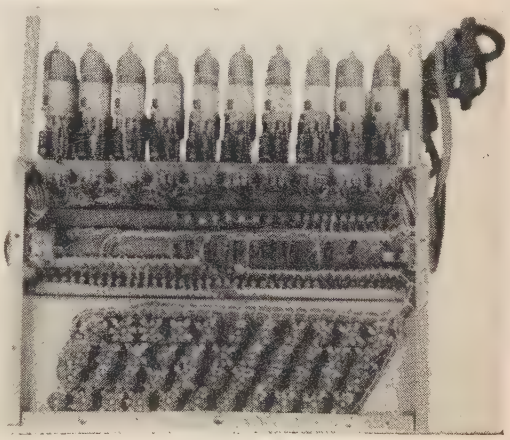
Electrically the Phantom Switch consists of a series of neon bulbs connecting the keys to the proper Sequence Selector thyratron. The keys, when pressed, apply B+ to the first odd numbered UIG necessary to form the character, and to whichever neon bulbs are connected to it (four in the case of the number zero, one each going to the grids of the Sequence Selector thyratrons 2, 6, 10, 14, and 18). The neon bulbs conduct, putting a positive voltage on the thyratron grid. The thyratron then turns on and furnishes, in turn, the plate voltage for the Keyer tube associated with it (as mentioned previously).

Servicing

Trouble-shooting is quite simple since the Codetyper will tell you what tube or circuit is defective merely by depressing one or two of the keys. All of the UIG's may be tested by pressing the "Error" key and listening to see how many dots are produced. Ten dots separated by nine spaces should be heard, if less dots than this are produced the faulty circuit is easily spotted. For example, if only six dots are heard, the trouble would be in either the tenth or eleventh UIG stage. For nine dots the trouble would be in the sixteenth or seventeenth stage. The defective tube or circuit can then be quickly replaced. The Sequence Selectors can be tested by pushing the "Ø" key and the "9" key and seeing if any of the dashes are missing. The "Ø" key tests the number 2, 6, 10, 14, and 18 stages, while the "9" tests number 4, 8, 12, and 16 stages.

In General

Many features of the Codetyper represent the latest developments in electronics. Of interest, for instance, is the plug-in turret type construction used for each of the stages. In this way most of the circuits can be interchanged for testing or may be removed for checking of the components. Also, it allows the whole chassis to be almost free of parts so that it can, with little difficulty, be opened up for checking the interconnecting wiring.



The Codetyper employs 40 tubes and the latest type of turret socket construction. The panel in the lower portion of the picture is the rear of the switching deck or keyboard. The Codetyper may be disassembled quite easily into three separate sections for servicing.

The power supply is a voltage doubler selenium circuit. Space is conserved by omitting any filter circuit from the supply, filtering being unnecessary for any of the circuits in the typer. The filaments are connected in series parallel across the 110 volt line, thus saving the space and weight of a filament transformer.

The Codetyper is smaller than a typewriter, fairly light in weight, and completely self contained. The cabinet, as you can see in the pictures, needs some streamlining, but that will no doubt come when the device is put into production. One factor that might bother non-c.w. men at first is the necessity for monitoring the code output of the machine so that letters will not be either run together or become overly spaced. Since characters such as the "Ø" are nineteen times as long as the "E," there is quite a wait for the machine to send all of some characters, while others are finished before the next key can be pressed. This, assures the designer, is a technique that is quickly learned.

Such an instrument, naturally, cannot be manufactured to sell in the low price field. Each of the plug-in turret constructed stages, if produced according to present plans, molded in plastic, will cost about five dollars. Thus the forty stages alone would cost about $200. The complete machine might then be estimated to sell in the neighborhood of $500.

SCRATCHI

(from page 4)

the dits and dahs start coming along my geenyus are getting puzzled expression on his face, and when test officially starts, puzzled expression are changing to look of bewilderment. However, he writing on the paper, and continuing to rite for two or three minutes.

After inspecktor gathering up papers to grade them I asking my friend what trubble is. He telling me that code machine sending code groups, and not plane text. Just then inspecktor coming out and telling the geenyus he failed the code test. Hokendoke!! there go my twenty bux. How can this happen? I knowing my friend can receiving 15 WPM — I watching him do it. He anxious to showing me he reely can reed code, so taking me to his house.

Before he start to receive code on tape, I asking him to use the key and send me some code, so he getting oscillator and connecting key to it. I tell him to send the alphabet, starting from letter A. Gracious to goodness, first thing I heering are "dah-dit; di-di-di-dah; di-dah-di-dah". The letter N, the letter V, and a WHAT? He stop sending when he heering me yell, so I ask him what the letter A is. "Dah-dit," he says. At this point lamp are beginning to glow feebly in Hon. Brain, so asking him to send hole alphabet. Sure enough, every letter backwards except letters like S where can't turning backside.

Now I are reely unexuberated, and are asking him how he can be so stoopid. He slitely mad at this, but getting tape recorder and playing what I sending. Sacremento Fujiyama!! This smart gentlefellow, this stewpendus geenyus, he are playing the tape backward! All code characters are natchurally backward! Of all the collosus idoits, he taking the brass-plated feed-through insulator. I explaining to him in series of loud shouts what happening, and Hon. Ed., what you thinking — he getting mad at me. He so mad he throwing me out of the house. I not only losing my twenty bux on acct. of his stoopidness, but losing dignity as well.

That nite I trying to figure what happen. Either I giving him tape before I rewind it, or he getting it backside to some way. But why are he mad at Scratchi? Next day I finding out. His lawyer are calling me to tell me I being sued for $5000 for anguish caused to his client in failing code examination and in teaching him code backwards. What can I doing? I being sued for $5000 and can't even figure out way to paying twenty bux I owe.

Are you knowing lawyer who be willing to handle this case for a cupple of bux, and maybe a tape recorder thrown in to boot?

Respectively yours,
Hashafisti Scratchi

DX & OVERSEAS

(from page 28)

ditions much better for overseas contacts with W1BB QSOing GW3ZV, G2PL, G6GM, G5GU and G3DIY. Heard at KV4AA were: WØNWX 1900 569, W8DOG 579, GW3ZV 349, G2PL 229, G6GM 229, W2TRC 569, W4ATC 589, W1EFC 578, W2FBA 579. QSO'd were W9NH 599, W2PEO 559, W8BKH 579, W2EQS 549, W1LYV 589, W1BB 569.

OH3NY has been hearing W1BB and K2USA in Finland.

VP7NM should have rig on 160 by now.—**CU** next tests.

QTH COLUMN

MP4KAF	P.O. Box 54 Kuwait, Persian Gu
HS1UN	United Nations ECAFE, Bangkol Thailand.
3A2AP	Via DL4IA
EA8BF (ex EA8MC)	Manuel Cenalmor, Box 8, La Lagu na, Tenerife, Canary Islands.
ZD6DU	Via RSGB.
ST2GL	Via RSGB.
VP4LZ	Via PY1AJ, Box 4022, Rio de Janc iro, Brazil.
HP2TP	Box 196, Colon, Rep. Panama.
KZ5BC	Box 235, Gatun, C.Z.
ZS2MI	Via ZS6BW, A. Sachs, Box 256 Bryanston, Johannesburg, Union o South Africa.
C9AM (ex ?)	Box 22, Matausaka, Japan.
DL4IE	Capt. A. W. Borgia, HQ EUCOM SIG. DIV. APO 403 PM. NY. (ex W6EOU W4POA)
EA9DC/DR	Via EA8AW P.O. Box 346, Las Pal mas, Canary Islands.
ZB2A	Via RSGB.
HP1LL	Herman Luria, P.O. Box 865, Bal boa, C.Z.
MC1WN	Norman, Box 206, Bengahzi, Tripoli North Africa.

VHF NEWS

(from page 50)

year on two, for the last three years, and WØDRW, who hasn't been far behind.

The Kansas City area 2-meter net continues active on 146.8 on Wednesday nights with about 8 stations usually participating. Active stations on the band include **WØDVV, DRW, DDX, FPH, LFW, HOZ, DVE, TMJ, CLA, EYO** and two novices **WNØEMX** and **WNØFHI** . . . WØONQ's new 4 'til midnight shift curtailed his activity . . . **WØHVW**, the third of the "Pleasant Hill 6-Meter Ridge Runners" joined the two-meter gang . . . **DDX** bought a 75A-2 for an i.f. behind the 2-meter converter, burnt out the r.f. coil with the 75 phone rig!

Jim states that last year's propagation conditions included about the average number of openings, but none compared with the big "W2BAV" opening of 1950. July and August were good in the K.C. area, but September and October were far below normal. At least three 800-mile openings occurred inasmuch as W8BFQ was heard by WØMNQ that many times. During the fall months, the high-pressure areas followed their normal paths, but did not "stagnate"—remain over the same area—for any great length of time.

Bob Schoening, **WØTKX**, reports from Minneapolis that **WØQIN** is now active on 6 and listening, at least, on 2 from the new QTH on a high hill at 3428 W. 76th St. His nearest and only neighbor is down the road several blocks . . . Harry, **WØOUE** is on 2 and 6; mostly 6, mobile . . . Other mobiles on 6 are WØQIN, SII, and URQ, who has another of his homemade receivers, tuning all bands through 50 mcs . . . **WØQIN** caught the December 6 meter openings; says they compared to those of last summer. QIN, OUE and URQ keep six alive; TKX hopes to get the 50 mc rig in service again when the new beam goes up in February.

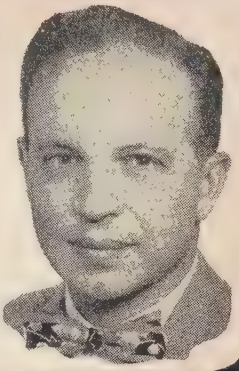
Canadian Capers

Iris, **VE3DER**, passes along a report from VE3ANY on the December 6-meter openings. On the 15th, at noon, W5AJG's beacon was heard, but no QSOs. At 3 p.m., W1GJO was heard, but too sporadically for a contact.

(Continued on page 56)

We Have the Most Satisfied Customers

Ask the fellows who deal with me. They'll tell you that WRL will allow you more for your present equipment — that WRL's large volume of sales means faster turnover and greater savings. Our customers know that we finance our own paper, eliminating all red tape. WRL buys more equipment — WRL sells more equipment. We offer the most personalized service anywhere. Deal With One of the World's Largest Distributors of Amateur Radio Transmitting Equipment. Special Attention Given to Foreign Orders Through Our Special Export Department. CABLE ADDRESS WRL1.



Leo I. Meyerson, WØGFQ

FREE!
NEW 1952 WRL CATALOG

NEW NOVICE CW 7 KIT $19.95

Here is a complete novice 80 meter AC-DC 7 watt transmitting kit — complete with tubes, power supply, tuning indicator, antenna, pi-network, key and crystal. Nothing left to buy — simply wire (complete instructions included) plug into AC socket and go on the air. Will operate on either 110 volts AC or DC.

NEW LOG BOOK

For mobile or fixed station. Spiral binding — turns up — lies flat. Full column log listing all FCC required info. Log will accommodate 1,525 stations. Front and back covers show "Q" signals, phonetic alphabet, and amateur international prefixes. 25¢

RADIO REFERENCE MAP

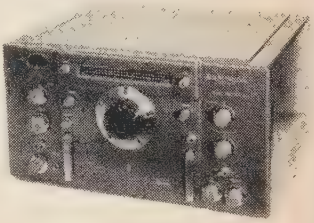
25¢ HANDY WALL SIZE

LEO GIVES BEST DEAL ON . . .

National RECEIVERS

ON HAND FOR IMMEDIATE DELIVERY!

HRO-50-1 RECEIVER

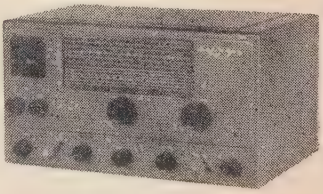


Additional I.F. Stage and 12 permeability tuned I.F. circuits result in the ultimate in selectivity!
Built-in power supply on separate chassis. Front panel oscillator compensation control. 20 to 1 precision gear drive. Provisions for NBFM adapter. Push-pull audio output. Speaker matching transformer built into receiver with 8 and 500/600 ohm output terminals.

$383.50
(less speaker)
LOW DOWN PAYMENT

10" PM Speaker matching cabinet **$16.00**

NC-125 RECEIVER



Covers 560 kcs to 35 mc in 4 bands. Voice or CW. National Select-O-Ject built-in. Includes AVC, automatic noise limiter, antenna trimmer, variable CW pitch control, separate R. F. and audio gain controls, jack for phone or NFM-73B adapter, volt rg, stabilized oscillator.

$149.50
LOW DOWN PAYMENT
(MATCHING SPEAKER) $11.00

NATIONAL RECEIVERS

SELECT-O-JET (#2 or #3) . . . . . $ 28.75
NC-183 (WITH MATCHING SPEAKER) $295.00
SW-54 . . . . . $ 49.95

WRITE FOR DETAILED SPECIFICATION EQUIPMENT SHEETS

WRITE WIRE PHONE 7795

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Please send me:
- ☐ New Log Book
- ☐ New Catalog
- ☐ Radio Map
- ☐ SW-54 Info
- ☐ Select-O-Jet Info
- ☐ HRO-50-1 Info
- ☐ CW 7 Kit Info
- ☐ NC-183 Info
- ☐ NC-125 Info
- ☐ Used Equipment List

C-L

Name_____
Address_____
City_____ State_____

Re "The 28-28"

Mr. J. Roy Smith, W6WYA has indicated several errors in his article on the mobile transmitter ("28-28," Dec., 1951, p. 23)

L1 should be wound with #24E instead of #20E.

L2 should be wound with #18E instead of #14E.

RFC1 may be either a 2.5 μf r-f choke or a single pi removed from a standard 2.5 μh choke, remounted on a small wooden dowel. Its inductance is not critical.

R9 may be reduced to 12,500 ohms if additional drive should be desired.

Re "11-80 Novice Transmitter"

It has been noted that the switch designations in the paragraph on "80 Meter Tuning Procedure" have been reversed. The filament switch should be labelled *S2* and the plate voltage switch should be called *S1*. The designation *S3* is erroneous and should be referred to as *S1*.

(By the way, like any radio publication we do not claim infallibility in either our schematics or text. Naturally we do everything possible to maintain the highest of standards. When errors have been discovered the appropriate corrections will always be noted in this Department.)

SWL Department

From time to time, and at an average of at least six letters per month, we receive requests that we start an SWL Department. This subject has been kicked back and forth among the publisher and staff for quite some time. It has in fact been given very serious thought on a number of occasions.

The principal argument in favor has been the self-evident gradual transition of SWL to Novice to General Class amateur. Undoubtedly to many an SWL Department may seem a natural step—one at the bottom of the ladder. On the other hand, it is felt that the SWL field is more than adequately covered, both in contemporary publications and excellent club bulletins and newsletters. Therefore, it is questionable whether or not sufficient interest exists to merit extending our coverage into this field. At the present time our answer must be "No."

Many Thanks

The new Managing Editor would like to take this opportunity to render his sincere thanks and appreciation for the many letters and cards received in the last few months commenting favorably on the "new and improved" *CQ*. Wherever possible these have been answered, but just in case yours was missed—many thanks!!

Air Mail Subscription Rates

The response to a number of inquiries on the possibility of obtaining subscriptions to *CQ* distributed via either First Class or Air Mail *(for some reason a number of subscribers who seem to be "loaded" want to make sure that they receive their copies as soon as they are released)*. Our Circulation Manager, Harold Weisner, informs me that the following rates are applicable upon request.

AIR MAIL SUBSCRIPTION RATES
Domestic Only

1 Year Subscription	$ 8.00
2 Year Subscription	15.00

FIRST CLASS RATES
Foreign and Domestic

1 Year Subscription	$ 6.00
2 Year Subscription	11.00

VHF NEWS

(from page 54)

On the 28th, 9 to 10:30 p.m., VE9RA, VE1QZ and QY were heard. VE9RA uses four horizontal dipoles. Reports will be appreciated. On December 30, VE9RA and VE1BC came through. BC worked VE3DFW, 3DLD and 3ATB between 10 and 10:15 p.m. Gord, **VE3ANY** heard, but did not participate in the openings. Gord reports that **VP2GG** is in Toronto, taking a course at the Radio College of Canada. He hopes to become a **VE3**, soon.

The **VE3BOW** Six Meter Trophy, won by VE3ANY during the last contest, finally arrived after Christmas! Re contests: it's a good thing they come around every few months so that we can say "hello" to old friends.

VE3AIB and **VE3BOW** compared notes on New Year's Eve and discovered they had both received identical barometers as Christmas presents! After midnight arrived, AIB and BOW (operating from temporary quarters) were joined by VE3DIR, QT, BUO, DAA, BGT and VT.

On January 5, VE3DER heard W8WJC, S6; W3WBM, S7; VE3AQG in QSO with W3QKI, whose beam was stuck, so he was only S5 . . . **VE3UT** appeared on 6 meters for the first time; he's an old 5-meter operator . . . **VE3DAN** still schedules W2ORI . . . **VE3AIB** hopes to be on with a pair of 8012s before you read this . . . Dick Lester, formerly **VE3EAH** is now **VE3HW**. He's busy at University, spends spare time with the Navy, but expects to be on in full swing, next fall. His VHF DX Scoreboard is 5 states, 4 call areas and 380 miles DX on Two.

"Sweepstakes" scores, reported by **VE3DER**, are, in part, **VE3AIB**: 64 on 2, 27 on 6 X 4 sections. **VE3DIR**, 90 contacts on 2 X 4 sections. **VE3ANY**, 38 on 2; 32 on 2 X 3. **VE3DHL**, 37 on 6 X 2. **VE3AQG**, 59 on 2 X 4. **VE3BOW**, 27 on 2 X 3. **VE3DER**, 18 on 2; 7 on 6 X 3. **VE3QT**, 18 on 2 X 3. VE3BCC, 30 on 6. **VE3AXT**, 59 contacts, 6 and 2 combined, X 3 sections. **VE3DIR** will receive the VE3BQN trophy; **VE3ANY** wins the VE3BOW trophy, again, and VE3AIB gets the certificate.

On January 18, the fifth get-together of the Southern Ontario VHFers was held at Riverside Tavern, Oakville, Ontario, under the able leadership of W2TBD and the Buffalo gang. Ninety-one hams were present, including W5HGU, Tom Swafford, the speaker, and XYLs VE3DMN and VE3DER.

Because of the ever-increasing number of W2s coming to the meetings, it was suggested by VE3ANY that the group be re-named the "Southern Ontario and Western

(Continued on page 58)

HARRISON HAS IT!

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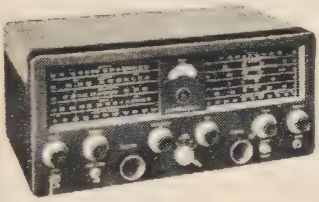

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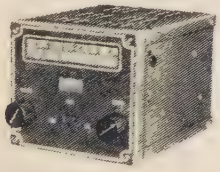

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BROAD BAND

(from page 6)

good reason to believe that IF ARRL was unwise enough to follow the dictates of its American membership. Canadian amateurs would be compelled to expand for protection alone. This threat effectively stopped 7 American votes on the Board from validating the March 1948 QST poll results. So the "top 100 KC of 20" was left fallow, and . . . VULNERABLE!!!

Step 3. Following ARRL's Board debacle on the 20 meter expansion question, saw a growth of minority groups within the US who took their troubles DIRECT to the F.C.C. From this evidence of unrest within the Amateur ranks, F.C.C. promulgated Docket 9295. Further, every indication has been given that future sub-allocation of our bands will be arrived at ONLY after all concerned are heard from (as witness the current 7MC situation) by the FCC. The one-time "voice-of-the-American-amateur", the ARRL—because of blind leadership and prejudicial direction—is little more than history.

This correspondent feels reasonably competent to outline the events which probably, more than anything else, lead to the lack of occupancy of the top end of 20—by virtue of being present—and voting—at all the ARRL Board meetings from 1948 to 1950. It was, further, this correspondent's desire, at the eve of the informal hearing on Docket 9295, in Washington in October, '49, to breathe some realism into ARRL's representation that he AGAIN moved that the matter of expanding 20 meter phone be lifted from the table where it had resided since the year before in May 1948 AND show some occupancy in the top end of 20. You can review the results of my efforts in QST. To the credit of Mr. Reid, it can be said, that he refrained from comment and voting on what he had THEN learned was basically an American problem. Personally, I have a very high regard for the able and distinguished Canadian representative, Mr. Reid.

Leonard Collett, WØDEA

Agana, Guam, M. I.

VHF NEWS

(from page 56)

New York V.H.F. Group." This passed, unanimously! Sixteen W2s were present! The next meeting of the Group will be held on May 16, under the leadership of the boys from Brantford, Kitchener and Galt. It is hoped that Managing Editor Ferrell will be the speaker. He will discuss The Three Years of RASO.

VHF Editor's Notes

Wonderful support, fellows! Thanks, so much! Be patient with me on answering letters; snowed under! Coming, next month: a review of the German 2-meter activity by DL4CK, Weishaden.

Many of you have asked what you can do to help. Well, first, if you send in a report it will be of great aid if you will break it up by using a separate sheet for each band, 50, 144, 220, 420 mc, etc. Saves time, gets the news under the right heading; confuses me less! Also, please help by not writing on the face of photos. Don't bend 'em, either, nor type on the back of them. Simplest deal is to write info on appropriate-size piece of paper and glue it to the back. Mark mailing envelopes, **"PHOTO; PLEASE DO NOT BEND!"** We can also use articles on v.h.f. gear of interest, antennas, converters, measuring equipment, gadgets, etc. but please make a brief outline of the proposed article—include photos, if available—and send it to Perry at the **New York** office. If the proposal is acceptable, you'll be well compensated for your efforts in writing the article.

73—Bill McNatt, W9NFK

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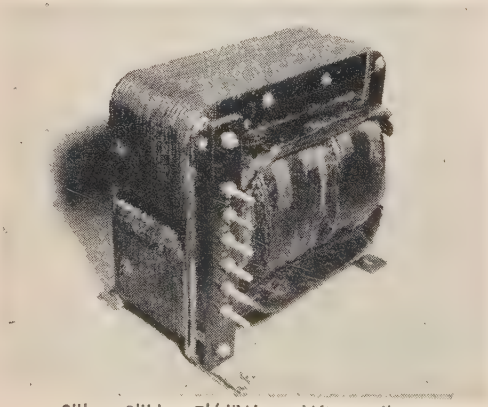

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MOBILE CORNER

(from page 29)

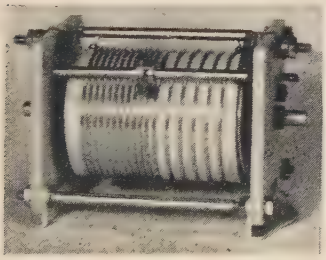
other than the Radio operator. Quite often it happens that two ham stations are aboard, one the radio operator's, the other an engineer. W4RW (ex W50TF) and W50CN among others are skippers of the ship. W2ZXM was the skipper of the Flying Enterprise and was quite active—many stations will recall contact with Kurt. Other articles will go into the actual activities so they will not be repeated here, the main point is that Kurt, being a ham, was able to establish radio communication with adjacent ships. W2PFL was probably the last one to QSO Kurt. He has written "We were in QSO on the day before Xmas as he was approaching the Channel. He told me he had been standing by for 48 hours, and it looked like a tough holiday for him. How true. I wanted to phone patch through to his wife but the band washed out." Van, W4RW had a short QSO with Kurt a couple of days before things went bad. The MM club is making Kurt a lifetime member in recognition of his devotion to duty.

Ady, W6YYT is back on the air. He is now on the Garden State bound for the Far East. W5OFO is still on the beach at New Orleans so far as is known at this time. W1LYF is on the Esso Charleston which suits him fine since it runs into Boston, his home QTH. W4TUG on the Alco Corsair is putting a rig aboard and will soon be MM along with W5STH on the Alcoa Clipper.

The Sec'y says that all the important MM news so far as the state-sides gang is concerned appears in CQ. The bulletins are not set up for general circulation. He's getting too many requests for them and the job of getting the bulletins out is going to get out of hand unless the circulation is curtailed.

Odds and Ends

Please ask your club Secretary to forward the Club Bulletin to this editor unless it is already being sent. These bulletins help to keep up on mobile activity. —When the little wife objects to a standard antenna on the car, ten meters can be operated with an abbreviated whip. One commercial manufacturer puts out a 55 inch whip which is matched with a stub on the co-ax. This whip looks like it is collapsible, but it isn't. (A receiving type whip will slip down after being used for transmitting because the r.f. anneals the springs and there's nothing to keep the whip extended.) Exhaustive tests by a local government agency shows a difference of only 2 db less using the short whip as compared to a standard quarter wave antenna. There's one catch—if you use the whip for BC, the stub shorts the feeder. This is easily gotten around by providing a relay to short the stub when you wish to transmit.—Our apologies for the word "portable-mobile" appearing in the column last month. There never has been a "portable-mobile" in the amateur service, though it does exist in commercial service. We've been "fightin'" for a long time to get the hams to use the correct term—"mobile". I didn't see it before it was printed.—Auto Calls will be in use in Hartford and Boston by the time this is printed—standard call of 1234 and the national emergency and calling frequency of 29.640 will be used.—Would like info on Pack Sets that are being used by any of the gang.



229-201

Winding is #14 tinned copper wire and has variable pitch to insure smooth tuning at low inductance values. Maximum inductance, 10 microhenries. May be applied with unused turns shorted or open as desired. Positive rolling contact maintained by beryllium copper tension springs. The form and end plates are Steatite. Overall size; width 2½", length 4½", height 3".

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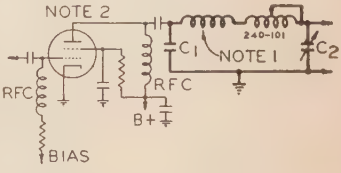

Note 1: Auxiliary inductor consisting of 7½ turns #14 wire 1 inch diameter self supporting; for improved 10 meter performance.
Note 2: 4D32, 4-65A, 807 parallel 807, 2E26 etc.

Write for data sheet 710 containing inductance curve and typical operating values for the 229-201, one of many JOHNSON inductors supplied for commercial applications.

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PROPAGATION

(from page 41)

Central and Eastern sections of the U.S.A. . . . On twenty, the early morning openings are expected again (about 8 a.m. local time), especially after the middle of March. The band should also open again later in the day and early evening . . . Improved DX conditions are expected on 40 and 80 meters.

ASIA: Some ten meter openings possible from the Pacific Coast to the Far East . . . Improved DX conditions are expected on 20 meters. As with the Oceania circuits, two distinct openings from all areas of the U.S.A. to the Far East should occur . . . This is the best time of year (equinox) for working into India. Some twenty meter openings should occur from all areas of the U.S.A. during normal propagation conditions . . . Propagation conditions to the Near East Asiatic countries are very similar to conditions described for the European circuits. In general, times for band openings will be similar, but signal intensities weaker.

NOVICE SHACK

(from page 24)

Other letters were acknowledged or answered by letter or card. I do my best to answer all questions promptly. There are several things that you can do that will speed up replies. One is to send your letters for *The Novice Shack* to me at my home in Gary, Indiana. If sent to our New York office, they must be forwarded to me. Another is when asking questions about malfunctioning equipment, please give full information about the circuits involved and the symptoms noted. The more carefully this is done, the more likely it is that I may be able to help you.

Experience has proved that often when one writes a letter requesting help in making a piece of defective equipment work, by the time he has given enough information for the recipient to form an intelligent opinion, the writer merely has to read his own letter to put his finger on the trouble.

Corrections

Two errors crept into the January column. One was the statement that no code test was required for a Technician-Class license. Actually code at five wpm is required. And in the diagram of the one-tube receiver, the DPST switch was marked SPDT.

See you next month. In the meantime, give me a call if you hear me. W9EGQ's on-the-air time is currently limited, but I can be found occasionally slightly below 3,700 kilocycles or above 3,725 kilocycles, battling it out with the VE phones.

73, Herb

YL'S FREQUENCY

(from page 31)

As is so often the way, Iris became interested in ham radio through her husband who has been licensed since 1929. At first she assisted her OM by testing over the mike and helping put up antennas, but as the radio bug bit deeper she learned the code and finally took and passed the exam in 1945.

Iris' first operating was done from W6AHI in San Francisco. In 1946 she joined her OM in Japan and

together they operated J2AHI-JA2KG for three years, being the first station in Japan to be awarded DXCC and WAZ. Iris was active in forming the Far East Amateur Radio League and was its first publicity director.

Iris and her OM returned from Japan via Asia, Africa and Europe and visited 26 of the 163 different countries they had worked from Japan. Iris says she was treated royally by hams in all 26 countries and especially enjoyed visits with VS6AP, CR9AG, VS1AX, GC4LI, GI5UR, G6ZO, OZ7UU, ON4GQ, and EI9N.

In 1950 Iris and Lloyd operated K2CC. In 1951 a move to North Carolina put them on the air under the call W4KE. They run a full KW to a pair of 4X400s and operate phone and c.w. on all bands.

Iris is a graduate of the University of California. She has an 11-year old daughter who is about ready to try for her Novice ticket, to make it another all-ham family. Iris' other hobbies include painting and architectual design. 33 es CUL—*W5RZJ*

BEAM POLES

(from page 13)

excavation and allowed to dissolve for thirty days before the pole was set. Since there is considerable moisture at this depth, it can be seen that the salt solution will disperse in an outward direction thus enhancing the conductive properties of the earth surrounding the grounding pipe. Judged as a chemical, the low concentration of the salt solution will act much as a preservative in the absence of oxygen.

Further References

Standard Handbook for Electrical Engineers, Fowle, McGraw-Hill

Architects and Builders Handbook, Kidder & Parker, Wiley

Biochemistry of Cellulose, Norman, Oxford, Claredon Press

Properties and Uses of Pentachlorophenol, Carswell & Nason

ELECTRONIC KEY

(from page 15)

for it fixes the point on the slope of the sawtooth at which *V2* will switch from mark to space, and consequently determines the duty factor for both dots and dashes.

The completed key has, then, three separate and independent controls: a ratio control, *R1,* that is used to set the ratio of dot speed to dash speed; a speed control, *R4,* that regulates the overall speed of the generated characters; and a weighting control, *R9,* that fixes the mark length of the dots and dashes.

Any of the low-mu triodes (e.g. 6C4, 6C5, 6J5, 12AU7) could have been used in the key; 6SN7's were chosen because of their low cost and because the extra triode section of one double triode could be used conveniently as a rectifier. The use of a

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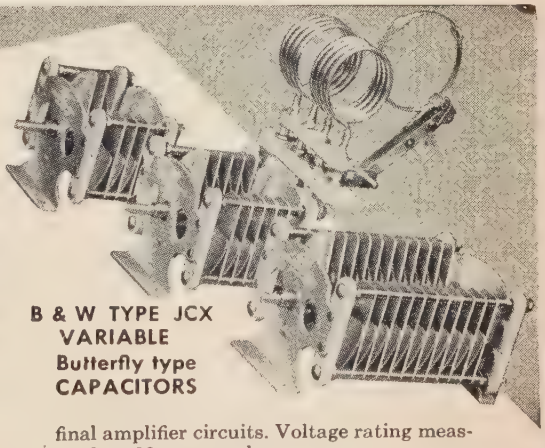

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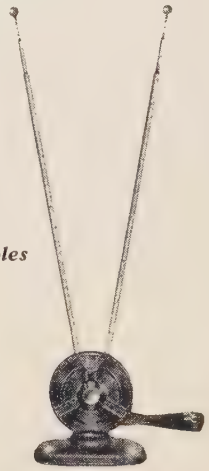

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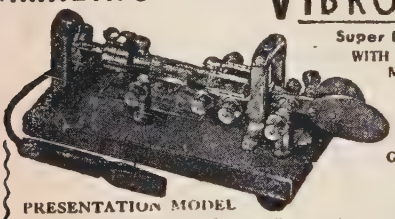

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transformer power supply, as shown, is urged strongly. Small 120-volt power transformers are now available from several manufacturers, cost little more than a filament transformer alone, and guarantee the construction of a safe piece of equipment without the complicated and questionable procedures involved in a hazard-proof ac-dc type of supply.

A properly chosen inexpensive relay will give good service in the key. The mark current at plate *(2)* of *V2* is about five milliamperes, so that any relay fast enough for keying and capable of closing on three milliamperes or less should do nicely. From the circuit discussion, it will be evident to the vacuum-tube keying enthusiast that a blocked-grid keying system, or similar arrangement, can be keyed directly with the voltage output across *R6*, thus eliminating the relay entirely. For those who may want to key a variety of transmitters, however, a pair of solid relay contacts is obviously an advantage.

Construction

As seen in the photographs, the circuit is built into a 3x4x5-inch utility box and is used with a separate, external key lever. The speed and weighting controls are located on the front face of the box, and the ratio control, which does not require frequent adjustment, is mounted on one of the removable cover plates. The on-off toggle switch is mounted on top of the box, slightly ahead of the tube sockets. A terminal strip on the rear face provides screw connections to the key lever and the relay contacts.

Initial adjustment of the key presents no particular difficulties. With the circuit constants given in the diagram, the speed range is approximately twelve to forty words per minute. The proper setting of the ratio control may be determined by ear or by one of the more accurate methods described previously.[3] There is considerable difference of opinion concerning the most desirable weight of dots and dashes, but the newcomer to automatic keying is cautioned that the most readable code is not obtained with excessively heavy characters.

PU EXPEDITION

(from page 19)

but it definitely proves that two sidebands are required for long-haul DX.[1]

Since the actual expedition was not at all difficult, our club is considering setting up a station in a location (which must be kept secret) exactly antipodal to Torpos Island. We may, for a fee, allow others to transfer their calls to this location and participate in the big QSO. We will QSL 100%, too! We think everyone who qualifies should have a big "PU" card to hang on the wall!

1. The latest theories on this subject indicate that not only two, but eight or ten separate sets of sidebands are desirable for long-haul DX.

To those of you who are ready to buy (or even to sell), these Reports will give you the latest price changes as well as the new and discontinued products. This monthly summary of the market is supplied by RADIO'S MASTER, The Industry's OFFICIAL Buying Guide, published by United Catalog Publishers, Inc., New York City. A complete description of each product is found in RADIO'S MASTER 16th Edition.

ANTENNAS & ACCESSORIES—TV, FM, AM

Amphenol—Packaged 300 Ohm Twin-lead No.'s 184-803 at $2.28 net and 184-804 at $2.91 added to their line.

Premax Products—Revised prices on their entire line of products which include Antennas & Accessories.

MISCELLANEOUS RADIO, TV AND ELECTRONIC PARTS

Audio Development Co.—Reduced prices of Output Transformers 314F to $23.64 net and 314G to $23.58 net.

Chicago Transformer—Reduced prices approximately 10% on their entire line of Transformers and Reactors.

Mallory, & Co.—Added 5 new Carbon & Wire Wound Controls and 3 new "LA" series Jacks.

National Co.—Decreased prices on Condensers PSE, PSL and PSR 25, 50 and 100 and also Bushings XS-3, 4, 5F, and 7 while increasing price of Insulators AA-3, GS-1 and 4A.

RECORDING EQUIPMENT, SPEAKERS, AMPLIFIERS, NEEDLES, TAPE, ETC. . . .

Approved Electronic—Added No. A-800 Pre-Amplifier at $37.50 and A-850 a 10 watt Amplifier at $34.50 net.

Atlas Sound—MS-10C, Mike Stand reduced to $5.85 net; also MS-12C, Sleeve Action stand to $6.30 net; SS-3, Speaker Stand to $20.55 net; ST-8, Saddle Fixture and Base to $3.60 net while withdrawing MS-11S, Mike Stand and MS-12S, Sleeve Action stand.

Masco—MHP-110 and MA-10-HF, High Fidelity Amplifiers reduced to $35.93 and $51.24 net respectively. MHP-110X and MA-10EX, High Fidelity Amplifiers with expander circuit reduced to $46.55 and $61.26 net respectively.

Scott, Hermon Hosmer—Added new relay-rack Type No. 221-A Laboratory Amplifier, rated power output 20 watt, at $148.50 net and 221-A1 Amplifier at $165.00 net, available on special order. (Output impedances of 4, 8, 16 and 500 Ohms)

TEST EQUIPMENT

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PLANETARY POSITIONS

(from page 17)

made a 180° arrangement with Saturn, and a 270° arrangement with Uranus. This was possible because on August 3rd Jupiter was 180° from Saturn, and on October 24th was 270° in relation to Uranus. A "rough estimate" indicates that this particular arrangement between Jupiter, Saturn, and Uranus can take place only once about every 180 years.

Jupiter and Saturn appear to be the most important planets in the solar system because by their relationships they can determine, or "set the stage" for both disturbed or quiet conditions. The arrangements of any other slow planets can, however, to some extent add or take away from their effectiveness. Theoretically, when Jupiter and Saturn are spaced near any multiple or 90° we should find the most disturbed years, and when spaced by a multiple of 60° the most quiet years. Analysis of past data substantiates this theory.

The *Figures 1* to *3* show planetary arrangements for three severe ionospheric storms in the past. The placing of the planets around the Sun is in heliocentric degrees of longitude measured from 0°, which is the place in the heavens occupied by the Sun on the Vernal Equinox, March 21st.

The cases selected are for severe ionospheric storms spotted over a wide span of years. It should be noted that in every case shown here there are three or more planets taking part in the arrangement. The most severe storms appear to accompany

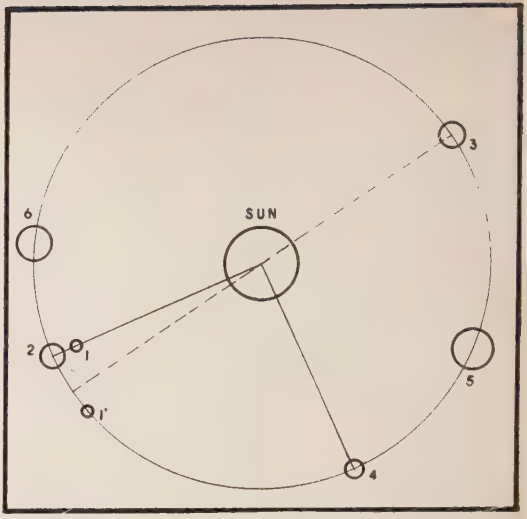

Fig. 3. Planet arrangement during severe storm of Oct. 27th to Nov. 2nd, 1950. Mercury and Venus are at a 0° arrangement while both are 270° from Mars. Note Earth almost 180° from Venus and that Mercury made a 180° with Earth Nov. 1st. Mercury shown as 1' for Nov. 2nd.

1. Mercury—204°-219°
2. Venus—204°
3. Earth—34°
4. Mars—295°
5. Jupiter—338°
6. Saturn—174°

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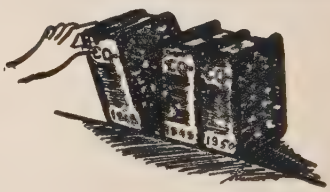

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cases where two of the planets are at 180° with a third planet 90° from each one—90° ahead of one and 90° behind the other as it moves around the Sun.

There is yet a great deal of research needed on this hypothesis of a planet position effect on our ionosphere. The surface has only been scratched and many puzzling phenomena need an explanation. Perhaps some amateurs can do worthwhile work on this problem and assist in developing its use even though the cause of the phenomena may remain obscure. It appears most likely that these planetary relationships effect the surface of the Sun and this effect is transmitted from the Sun to the Earth's ionosphere in some unknown manner.

MEN OF RADIO

(from page 22)

ating radio waves for a number of years. Marconi's work which consisted, to some extent, of perfecting existing apparatus and coordinating the various units (transmitter, receiver and antenna) into a workable system, depended upon the Hertzian oscillator as a source of waves, but Hertz's antenna was neglected and remained a laboratory curiosity for some time. Furthermore, Marconi soon learned (as Hertz probably had suspected) that the Hertz receiving apparatus was far too insensitive, and abandoned it after a few early trials.

Branly's Coherer

Meanwhile, between the Hertz experiments and the Marconi trials, a device had been developed which was destined to have a profound effect upon the future of the art. The inventor of the device, Edouard Branly, professor of physics at the Catholic Institute in Paris, had become interested in physiology, especially in the study of nerve structure. He was fascinated by the observation that a nerve consisted of a mass of closely packed fibers, and may have had some idea of developing the electrical counterpart of such a structure; at any rate, his research led to an investigation of the properties of fine particles when massed together. The subject had been given some attention by earlier scientists, and one of these had successfully used finely powdered carbon in a lightning protector for telegraph lines. When a tube filled with carbon dust was connected between the elevated telegraph wire and the earth, it offered a high resistance to the flow of direct current, but an alternating current, such as that resulting from lightning discharge, lowered the resistance. In this way, the lightning discharge was diverted to ground without harming the telegraph instruments.

Branly found that a mass of carbon or metal particles would act in this peculiar manner while under the influence of an induction coil spark as well as when exposed to lightning discharges. He further learned that the effect was the result of a clinging together, or cohesion, of the particles. In

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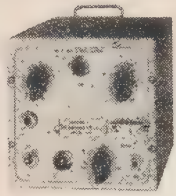

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1891 Branly described his work to the French Academy of Science; the apparatus he used resembled that shown in *Fig. 3*. A small-bore glass tube, *A*, was fitted with two metal plugs, *B*. In the narrow gap between the two plugs, a small quantity of iron filings, *C* was placed. The tube was connected in series with a battery, *D*, and a sensitive galvanometer, *E*. Under ordinary conditions, the galvanometer gave no indication of current flow, but when Branly closed the primary circuit of an induction coil placed about 75 feet distant from the tube, the needle of the galvanometer was deflected. The packed filings, however, would not automatically separate, or "decohere" after the coil ceased to operate, but could be restored to normal condition by tapping or shaking the tube.

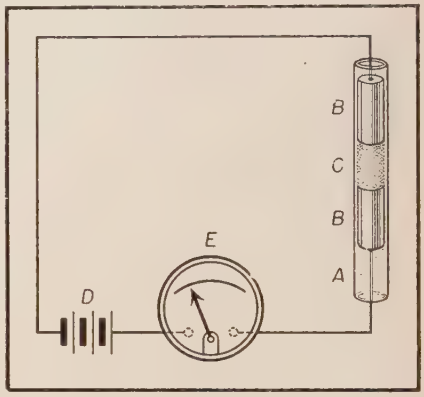

Fig. 3. Basic principles of Branley's coherer.

Branly's discovery was extensively used in lecture work by Sir Oliver Lodge who was thoroughly familiar with Heinrich Hertz's work; Branly may not have been aware that the induction coil generated Hertzian waves, but Lodge certainly was. He used the Branly and Hertz equipment in sending and receiving wireless waves over a distance of 100 yards or more and thus became the first man knowingly to use the Branly "coherer" (the name was coined by Lodge) in receiving wireless waves.

Branly was awarded the Nobel prize for his work almost thirty years after he invented the coherer. By that time, the coherer had achieved fame with Marconi and had long since been supplanted by a long series of inproved detectors: the electrolytic detector, the magnetic detector, the crystal detector and the Aladdin's lamp of radio, the vacuum tube. The inventor of the coherer lived until 1940, when he saw his native land invaded by Nazi armies. As he witnessed the attempts of the enemy to divide the sympathies and allegiance of the French people by the use of radio propaganda, he wondered whether the development of the science had not been a mistake. In fact, he was so disappointed and disillusioned that he was led to express regret, publicly, that his invention had helped to make radio possible.

CONVERTER-XMTR

(from page 37)

with three springs imbedded in one side and a copper strip running the length of the other side. A wire which goes to the filament portion of switch *S3* is fastened to the copper strip. The pressure of the springs against the back cover pushes the piece of wood forward so that the copper strip contacts the positive terminals of the cells. At the same time, the springs are sufficiently strong to force the A-battery cases back against four round head screws placed in the partition, thus insuring proper negative contact to the case.

Since it will seldom need replacement, the bias battery is made by soldering four penlite cells in series, and then taping them into one compact unit.

Operation

Results obtainable with the converter-transmitter depend to a great extent on the type of antenna employed. In some cases it will be possible to use a half wave. A convenient dipole that can be stored in a small space may be made from two 8-foot pieces of stranded hookup wire soldered to a 20-foot section of 75 ohm twinlead. In those instances where no tree, wall or other nearby object can be used to support such a dipole, it will be necessary to rely on a vertical whip.

Note that a square of ⅜" polystyrene has been mounted on the top of the case, just above and behind the antenna terminals. A hole drilled in the center of this insulator was tapped to take the threaded end of a surplus AN-131-A antenna. A lead was permanently soldered to a point near the base of this whip for convenient connection to one of the screws on the antenna terminal. When using the vertical, the case is made to act as a counterpoise by grounding the other antenna terminal screw.

While the transmitter will work to some extent with a rod a foot long, much better results will be achieved as the length of the vertical is increased to a maximum of 8 feet. Difficulty may be experienced in obtaining proper loading if this length is exceeded. Whenever it is practical to do so, use the dipole mounted as high and in the clear as possible. In a pinch, though, you should be able to get by fairly well with a whip.

Actual on-the-air checks have been made using the converter-transmitter to contact various mobile units. With a 3-foot whip, signals were weak, but readable a mile and a half away. A horizontal attic dipole, despite the cross polarization provided a good signal at 3½ miles and an average 10-meter beam produced a very good signal at 5½ miles. When attached to the vertical J antenna used by the local Civil Defense group, all mobiles within a radius of several miles reported the rig to be loud and clear. During these tests, the converter performed so well that it is safe to claim that any station that can be worked can be heard.

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Total weight of the converter-transmitter, including batteries, mike, dipole, tools, etc., is a little over 10 pounds. Even when added to the weight of an accompanying battery receiver, the combination is light enough so that it can be carried for quite a distance, without breaking one's back. Once set up, whether in an emergency hospital, in some spot isolated by power failure, or wherever communication is urgently needed, this little rig will perform yeoman's service until a larger unit can be brought in to take its place.

OLD ONE-TWO

(from page 40)

both plate dissipation and tank circuit losses, the latter a figure frequently overlooked by enthusiastic amateurs "guesstimating" the efficiency of their rigs.

The writer has tried this rig on both 80 and 40, and results have been good, especially considering the antenna used. It was about 50 feet of 28 gauge wire strung around the second floor of a house. The last 25 feet was strung around in a loop in a storage room. The antenna was voltage fed through a link coupled tuner for 40, and current fed against the chassis ground on 80. Quite a few stations in the eastern part of the country and in the middle west were worked with fairly good signal reports. Our results in calls per contact were good, and only one station lost us in QRM.

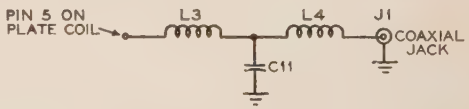

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Fig. 3. A simple low pass filter for reduction of possible TVI.

Currently, the first question asked about a transmitter is "how is it on TVI?" We lived a few miles from WTAR-TV, channel 4, in Norfolk, Virginia. Our TV receiver was about 25 feet from the transmitter, and both used indoor antennas. We experienced no TVI from either 80 or 40 meter operation. Contacts were made while our little helpmate (and prospective novice) watched programs. We did detect harmonics up to about 90 megacycles on an SX-42, which is about 15 feet from the transmitter. They were very weak, however, and were eliminated with the simple low pass filter shown in *Fig. 3*. This filter is designed for a cutoff frequency of 15 megacycles, and, theoretically, has an attenuation of about 35 db at 60 megacycles. This works out fairly well with

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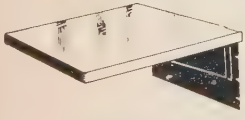

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the non-inductive dummy load. An antenna, however, does not present a pure 51 ohm impedance throughout the frequency spectrum, and such a filter may have more or less attenuation than predicted. In any case, it will help knock out the harmonics. If the filter is desired, it is inserted between *pin 5* of the coil socket and the coaxial output connector.

Both of the previous articles on this transmitter recommended the use of a small choke in one plate lead, in order to kill a parasitic oscillation. We couldn't find the parasitic, so we omitted the choke. Previously, it has been found that 1614 tubes possessed marked advantages over the 6L6G's in r-f service. They were tried in this rig with discouraging results. The tubes are just not good oscillators. Various remedies were attempted, including grounding the tube shells, but they still didn't oscillate as well as 6L6G's. The trouble was found to be insufficient plate to grid capacity in the 1614 to sustain oscillation. Adding 1 $\mu\mu$f condensers between plate and grid of each tube made the 1614's very vigorous oscillators. Other tube types tried were 6V6GT's and 6L6GA's. (The 6L6GA's were in the rig when the pictures were taken.) Both types worked well without additional feedback capacity. The 6V6GT's were loaded to 90 watts and didn't burn out. However, if you're going to use this type, a more conservative figure would be 330 volts on the plates, with about 285 volts on the screens, and about 120 milliamperes plate current.

Crystal current is very low in this transmitter. It runs about 20 or 30 milliamperes on 80 meters, and about 40 milliamperes on 40 meters, for the benefit of those who are worried about crystal longevity.

One last note may be in order. Someone might be curious as to why the terminal board arrangement is as shown. We wanted to try screen keying and we wanted to have an extra terminal for use with a plate meter. Thus, the screen voltage is connected to *terminal 5,* and the key (or relay) is connected to *terminals 5* and *6 for* screen keying. For plate current measurement, we connect the B plus lead to *terminal 7,* and connect the milliammeter between *terminals 7* and 8. Screen keying worked even better than did cathode keying, with this transmitter, but it's a dangerous system unless a keying relay is employed, inasmuch as 300 very positive volts appear on the key.

There is one vital precaution to observe. Don't touch the plate coil and don't make loading adjustments with the power on. Treat that plate coil with the same respect you would give a cobra!

All in all, we're pleased with this "Old One-Two." The only part of the bargain I have left with my wife, now, is to get her a Novice ticket.

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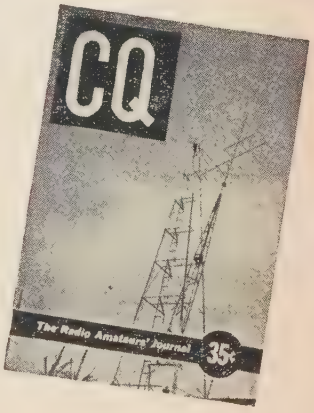

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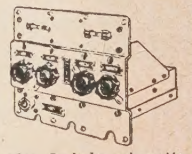

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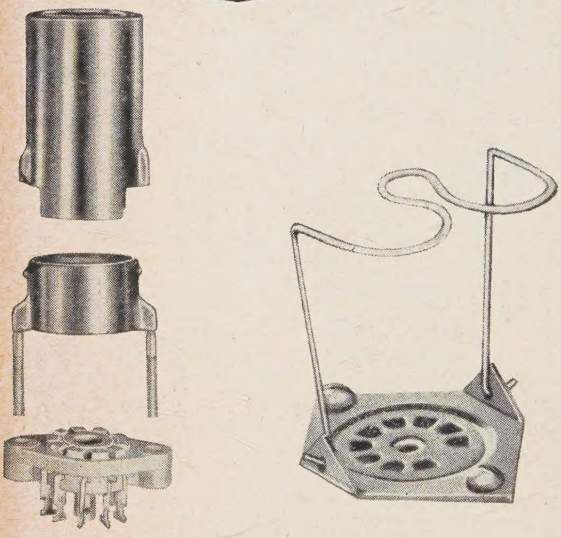

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CQ Ad Index

Atronic Corp.	68
Barker & Williamson	61
Bliley Electric Company	6
Bud Radio, Inc.	51
Burstein-Applebee Co.	65
C. & H. Sales Co.	70
Collins Radio Company	10
Columbia Electronics Sales	65
Communications Equipment Co.	68
Eastronic Sales Co.	58
Eldico of New York, Inc.	51
Eitel-McCullough, Inc.	8
Electronic Technical Institute	67
Electronicraft, Inc.	66
Engineering Associates	70
Finnegan, H.	68
General Electric Company	1
Hallicrafters Company	Cover 2
Harrison Radio Corp.	57
Harvey Radio Company, Inc.	7
Instructograph Company	62
JFD Manufacturing Co., Inc.	62
Johnson, E. F. Co.	59
Lettine Radio Mfg. Co., Inc.	70
Millen, James Mfg. Co., Inc.	4
Motorola, Inc.	63
National Company, Inc.	72, Cover 3
National Schools	5
Northrop Aircraft, Inc.	63
Petersen Radio, Inc.	2
Premax Products	68
Radcom Engineering Co.	66
Radio Corp. of America	Cover 4
Sanett, Robert	66
Shure Brothers, Inc.	51
Tab	72
Tallen Company, Inc.	67
Trans-World Radio-TV Corp.	66
Turner Company	51
United Air Lines	66
Vibroplex Co., Inc.	62
Web Electronics Mfg. Co.	66
World Radio Laboratories, Inc.	55

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2K25, 723AB	6L6M	726C	5686
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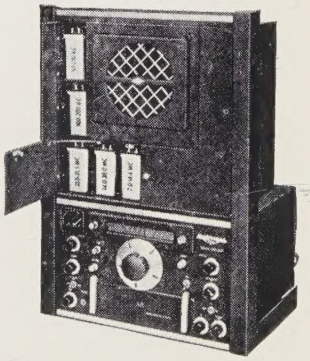

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